ALBUQUERQUE
INTERNATIONAL SUNPORT

SUSTAINABLE AIRPORT MASTER PLAN

SUSTAINABLE AIRPORT MASTER PLAN

For

ALBUQUERQUE INTERNATIONAL SUNPORT
Albuquerque, New Mexico

Prepared By

Coffman Associates
Airport Consultants

MOLZENCORBIN

With Contributions From

CONSENSUS PLANNING
LANDSCAPE ARCHITECTURE
URBAN DESIGN
PLANNING SERVICES

SMPC Architects
PRINCIPALS OF DESIGN.

Quest
energy group

December 2019

TABLE OF CONTENTS

INTRODUCTION AND SUMMARY

MASTER PLAN GOALS AND OBJECTIVES 2
Airport Guiding Principles 3
Introduction to Sustainability 4
WHAT IS SUSTAINABILITY 5
SUSTAINABILITY AND THE FEDERAL AVIATION ADMINISTRATION 6
THE MASTER PLAN AND THE SUSTAINABILITY PLANNING PROCESS 7
PUBLIC PARTICIPATION 8
SUMMARY AND RECOMMENDATIONS 8
Sustainability Goals 9
Proposed Master Plan Concept 11
Capital Improvement Plan and Cost Summaries 16
Sustainability Plan 19

Chapter One – INVENTORY

REGIONAL SETTING 2
Airport Location 4
Regional Transportation Network 4
Climate 5
AIRPORT HISTORY AND BACKGROUND 7
HISTORICAL AERONAUTICAL ACTIVITY 8
Passenger Enplanements 8
Air Cargo 10
Aircraft Operations 12
Based Aircraft 13
AIRPORT ADMINISTRATION 13
AIRPORT SYSTEM PLANNING ROLE 14
Federal Airport Planning 14
State Airport Planning 19
14 CFR PART 139 CERTIFICATION 20
AIRFIELD FACILITIES 22
Runways 22
Taxiways 25
Pavement Markings 26
Pavement History and Condition 26
Airfield Safety 27

Chapter One (Continued)

Airfield Lighting 27
Weather and Communication Aids 31
AREA AIRSPACE AND AIR TRAFFIC CONTROL 32
Airspace Structure 32
Special Use Airspace 36
Airspace Control 37
Electronic Navigational Aids 38
Instrument Approach Procedures 38
Terminal Arrival and Departure Procedures 39
Local Operating Procedures 39
Regional Airports 42
PASSENGER TERMINAL COMPLEX 42
Terminal Building History 42
Changes and Additions 45
Terminal Architecture 49
Terminal Organization 51
Terminal Building Systems 63
Terminal Loading Bridges 63
Terminal Aircraft Apron 64
Terminal Access 64
Terminal Loop Road and Curbfront 64
Vehicle Parking 70
Rental Car Facility 73
TERMINAL TENANTS AND SERVICES 73
Aviation Department 73
Airlines 73
Federal Inspection Services and Security Stations 75
Concessions 75
Ground Transportation 77
Public Spaces and Circulation 77
Public Service Concessions 77
Public Restrooms 77
Amenities 78
LANDSIDE FACILITIES 79
Terminal Area Facilities 79
Southwest Area Facilities 85
Airport Support Facilities 90
Utilities 93
AREA LAND USE 97
Other Land Uses 97
LOCAL PLANNING DOCUMENTS AND POLICIES 105
Albuquerque/Bernalillo County Comprehensive Plan 106

Chapter One (Continued)

SOCIOECONOMIC CHARACTERISTICS 111
ENVIRONMENTAL INVENTORY 112
Land Use and Noise 113
Biotic Resources 114
Water Quality 118
Wetlands 119
Floodplain and Floodways 119
Geology and Soils 120
Solid and Hazardous Waste Sites 120
Historic and Cultural Resources 121
DOCUMENT SOURCES 122

Chapter Two – AVIATION DEMAND FORECASTS

SUNPORT SERVICE AREA 3
SOCIOECONOMIC TRENDS 5
NATIONAL AVIATION TRENDS 9
U.S. Economic Outlook 9
U.S. Travel Demand 10
FORECASTING APPROACH 12
COMMERCIAL PASSENGER SERVICE FORECASTS 14
FAA Commercial Air Carrier Forecasts 14
FAA Commercial Aircraft Fleet Forecast 15
Historical Commercial Passenger Activity 17
Enplanement Forecasts 26
Airline Operations Forecast 33
AIR CARGO 36
National Air Cargo Trends 36
Air Cargo Forecast 39
All-Cargo Operations 40
GENERAL AVIATION FORECASTS 40
National General Aviation Trends 40
Based Aircraft Forecast 45
Based Aircraft Fleet Mix 49
General Aviation Operations 51
OTHER AIR TAXI & MILITARY OPERATIONS FORECASTS 56
Military Activity 56
Forecast Comparison to the FAA TAF 57
FORECAST SUMMARY 58
AIRCRAFT/AIRPORT/RUNWAY CLASSIFICATION 60
Aircraft Classification 60

Chapter Two (Continued)

Airport and Runway Classification 62
CRITICAL DESIGN AIRCRAFT 65
Airport Design Aircraft 66
Runway Design Aircraft 66
SUMMARY 68

Chapter Three – SUSTAINABILITY BASELINE ASSESSMENT

SUSTAINABILITY AND THE SUNPORT 1
Tenant Sustainability Questionnaire 3
BASELINE ASSESSMENT CONTENTS 4
WASTE MANAGEMENT AND RECYCLING 5
Background 5
Solid Waste 6
Green Waste 8
Potential Opportunities for Performance Improvement 9
ENERGY 9
Background 9
Electric Utility Data 10
Natural Gas 13
Renewable Energy 14
Potential Opportunities for Performance Improvement 16
AIR QUALITY AND GREENHOUSE GAS (GHG) EMISSIONS 16
Background 16
Current Performance/Baseline Information 18
Potential Opportunities for Performance Improvement 22
WATER CONSERVATION AND WATER QUALITY 23
Background 23
Current Water Use 25
Potential Opportunities for Performance Improvement 30
SURFACE TRANSPORTATION 31
Background 31
Transportation Modes 32
Potential Opportunities for Performance Improvement 41
NATURAL RESOURCE MANAGEMENT 41
Background 41
Procurement 41
Green Cleaning 42
Construction Management 43
Potential Opportunities for Performance Improvement 43

Chapter Four – AIRPORT FACILITY REQUIREMENTS

PLANNING HORIZONS 1
PEAKING CHARACTERISTICS 2
Airline Peaking Characteristics 3
General Aviation Peaking Characteristics 4
Total Operations Peaking Characteristics 6
AIRFIELD CAPACITY 6
Hourly Runway Capacity 10
Annual Service Volume 10
Aircraft Delay 11
Capacity Analysis Conclusions 11
AIRFIELD REQUIREMENTS 11
Runway Configuration 14
Runway Design Standards 17
Runways 23
Taxiways 27
Instrument Navigational Aids 34
Visual Navigational Aids 34
Weather and Communication Aids 35
LANDSIDE REQUIREMENTS 36
Passenger Terminal Complex 36
Terminal Curb 46
Vehicle Parking 47
Air Cargo Requirements 48
GENERAL AVIATION FACILITIES 49
Aircraft Hangars 50
General Aviation Aircraft Apron 51
General Aviation Terminal Services 53
General Aviation Vehicle Parking 53
General Aviation Summary 54
AIRPORT SUPPORT REQUIREMENTS 54
Aircraft Rescue and Firefighting (ARFF) Facilities 54
Snow Removal Equipment 56
Airport Maintenance Facilities 57
Fuel Storage 58
Perimeter Fencing 59
INFRASTRUCTURE CONSIDERATIONS 60
Storm Sewer 60
Commercial Power 60
Solar Power Generation 61
Natural Gas 62
SPECIFIC AREA REVENUE SUPPORT REQUIREMENTS 62
Aviation Center of Excellence 65

Chapter Four (Continued)

Sunport Business and Technology Center 66
Puerto Del Sol Golf Course 67
Property North of Airport Loop Road and West of Girard 68
Property Located in the Northeast Corner of Sunport Boulevard and University Boulevard 68
Property Located in the Southeast Corner of Sunport Boulevard and University Boulevard 70
Property Located at the Northeast Intersection of George Road and University Boulevard 70
Yale Landfill – Development Potential 71
SUMMARY 72

Chapter Five – AIRPORT DEVELOPMENT ALTERNATIVES

NO-ACTION/RELOCATION ALTERNATIVES 2
REVIEW OF PREVIOUS PLANNING DOCUMENTS 3
PLANNING CONSIDERATIONS 3
AIRFIELD DEVELOPMENT CONSIDERATIONS 4
Runway Design Standards 4
Coupled Runways 14
Runway Length 15
Runway Width 15
Hold Line Separation Standards 15
Taxiways 16
Taxiway “Hot Spot” Mitigation 20
Runway 8 Approach Surface 29
Direct Access at Taxiways A2 And A3 30
Taxiway Exit on Runway 3-21 33
LANDSIDE DEVELOPMENT ALTERNATIVES 34
General Aviation 34
Air Cargo 37
Passenger Terminal Complex Considerations 37
Non-Aviation Land Use Concepts 43
ALTERNATIVES SUMMARY 47
SUSTAINABILITY GOALS AND OBJECTIVES 48
Sustainability Goals 48
Sustainability Objectives and Initiatives 49
Alternative Sustainability Screening Criteria 51

Chapter Six – RECOMMENDED DEVELOPMENT CONCEPT

AIRSIDE ALTERNATIVES REVIEW AND RECOMMENDATIONS 2
Convergence of Runways 8 and 12 2
Runway 26 Design Standards 9
Runway 3-21 Design Standards 9
Runway 12-30 Width 10
Runway Length 10
Taxiway Exits for Runway 8-26 11
Taxiway Hold Line Location 11
Hot Spot Remediation 12
Hot Spot #1 12
Hot Spot #2 15
Hot Spot #3 15
Hot Spot #4 16
Direct Access at Taxiways A2 and A3 16
Other Airside Recommendations 17
PASSENGER TERMINAL AND WEST AREA PLAN 19
Terminal Expansion 19
Bag Screening 20
West Area Plan 20
LANDSIDE RECOMMENDATIONS 20
Maintenance Facilities 23
Fuel Storage 23
Air Cargo Facilities 23
General Aviation 23
LAND USE PLAN 26
Airfield Operations 26
Aviation Development 26
Non-Aviation/Commercial Support 29
SUSTAINABILITY PERFORMANCE TARGETS 34
Waste Management and Recycling 35
Energy 37
Air Quality and Greenhouse Gas (GHG) Emissions 38
Water Conservation and Water Quality 39
Surface Transportation 40
Natural Resource Management 41
SUMMARY 42

Chapter Seven – IMPLEMENTATION PLAN

CAPITAL IMPROVEMENT FUNDING SOURCES 1
Federal Grants 2
Passenger Facility Charge (PFC) 5
State Funding Programs 6
Local Funding 7
SUNPORT DEVELOPMENT SCHEDULES AND COST SUMMARIES 7
Short-Term Improvements 10
Intermediate-Term Improvements 12
Long-Term Improvements 17
Capital Improvement Summary 18
FUNDING PLAN 19
SUMMARY 20
SUSTAINABILITY IMPLEMENTATION PLAN 21
Objective Evaluation 21
Sustainability Monitoring Program 22
FUNDING SOURCES 27
AIP Grant Funding 27
Non-AIP Funding Sources 29
SUSTAINABILITY PLAN SUMMARY 31

EXHIBITS

Introduction

iA Planning Horizons 10
iB Development Staging 13
iC Non-Aviation Land Use Plan 17

Chapter One – INVENTORY

1A Airport Vicinity Map 3
1B Capital Projects Since 2000 9
1C Historic Passenger Enplanements 11
1D Historical Operations and Based Aircraft 15
1E Airport Administration Organization Chart 17
1F Airfield Facility Data 23
1G Airfield Signage Plan 29
1H Airspace Structure and Vicinity Airspace 33
1J Instrument Approach Data 40
1K Regional Airport Facility Data 43
1L Terminal Building Layout 1st Floor 53
1M Terminal Building Layout 2nd Floor 55

1N Terminal Building Layout 3rd Floor 59
1P Terminal Building Layout 4th Floor 61
1Q Terminal Gate and Apron Detail 65
1R Access and Vehicle Parking Detail 67
1S Terminal Curb Configuration 71
1T Rental Car Facility Layout 74
1U Landside Facilities 81
1V Terminal Area Facilities 83
1W Southwest Area Facilities 87
1Y Utilities 95
1Z Area Land Use 99
1AA Existing Zoning 101
1BB Area Plans and Bike Trails 103
1CC Land Use with Noise Contours 115
1DD Mesa Del Sol Development Plan 117

Chapter Two – AVIATION DEMAND FORECASTS

2A Airport Service Area 6
2B Socioeconomic Conditions 7
2C U.S. Commercial Air Carrier Forecasts 16
2D National U.S. Commercial Fleet Forecast 19
2E Historical Enplanements by Airline 22
2F Top Twenty Destinations/Non-Stop Service City Pairs 25
2G Enplanement Forecasts 31
2H Aircraft Seating for ABQ Carriers 34
2J Air Cargo Forecasts 38
2K National General Aviation/Air Taxi Forecasts 43
2L Registered and Based Aircraft Forecasts 50
2M Local & Itinerant General Aviation Operations Forecast 54
2N Forecast Summary 59
2P Aircraft Classification Parameters 61
2Q Example Turbine Aircraft Classification 63
2R Jet Operations by Classification 67

Chapter Three – SUSTAINABILITY BASELINE ASSESSMENT

3A Water Meter Locations 26
3B Bus Routes Near Sunport 33
3C Bike Paths Near Sunport 37

Chapter Four – AIRPORT FACILITY REQUIREMENTS

4A Peak Enplanement Periods 5
4B Airfield Capacity Factors 7
4C Runway Use Scenarios/Hourly Capacity 8

4D Airfield Demand vs. Capacity 12
4E FAA Design Standards 13
4F Wind Roses 15
4G Airfield Safety Areas 19
4H Airfield Hot Spot and Geometry Issues 31
4J Airside Requirements 37
4K Terminal Building Capacity and Requirements 39
4L General Aviation Requirements 55

Chapter Five – AIRPORT DEVELOPMENT ALTERNATIVES

5A Current Airport Layout Drawing 5
5B Planning Considerations 7
5C Runway 8 RPZ Alternatives 11
5D Taxiway Exit Analysis 17
5E Potential Excess Pavement 21
5F Hot Spot 1 Alternatives 22
5G Hot Spot 2 Alternatives 24
5H Hot Spot 3 Alternatives 26
5J Hot Spot 4 Alternatives 28
5K Taxiway A Alternatives 31
5L Runway 3-21 New Exit Taxiway Evaluation 33
5M General Aviation Alternatives 35
5N Air Cargo Alternative 39
5P Terminal and West Area Considerations 41
5Q Non-Aviation Land Use Alternatives 45

Chapter Six – RECOMMENDED DEVELOPMENT CONCEPT

6A Recommended Concept 3
6B Runway 8 Approach Surface Detail 7
6C Hot Spot #1 Recommendation 13
6D Terminal and West Area Plan 21
6E General Aviation Plan 25
6F Sunport Land Use Plan 27
6G Non-Aviation Land Use Plan 31

Chapter Seven – CAPITAL IMPROVEMENT PLAN

7A Capital Improvement Program 11
7B Development Staging 13
7C Short Term Runway 8 and 12 Decoupling 15
7D Sustainable Objective Evaluation 23
7E Report Card 25/26

APPENDICES

Appendix A - GLOSSARY OF TERMS

Appendix B - PAVEMENT CONDITION AND HISTORY

Appendix C - SUSTAINABLE MANAGEMENT SYSTEM REFERENCE DOCUMENT

Appendix D - WATER USE REPORT AND CONSERVATION PLAN UPDATE

Appendix E - ENERGY AUDIT REPORT

Appendix F - SRM RUNWAY 12-30 FINAL REPORT

Appendix G - AIRPORT LAYOUT PLAN

SUSTAINABILITY SUPPLEMENTAL REPORT

(Included on CD in the back of this document)

Section 1 – Sustainability Management System Reference Document

Section 2 – Water Use Report and Conservation Plan Update

Section 3 – Energy Audit Report

INTRODUCTION AND SUMMARY

ABQ INTERNATIONAL SUNPORT

Sustainable Airport Master Plan

INTRODUCTION AND SUMMARY

The Albuquerque International Sunport (ABQ) is a thriving, medium-hub, commercial service airport serving the aviation demand of the greater Albuquerque region and much of the State of New Mexico. This sustainable airport master plan update has been undertaken to evaluate the airport's capabilities and role, to review forecasts of future aviation demand, and to plan for the timely improvement of facilities that may best meet that demand and maintain compatibility with the environs. The airport master plan will provide systematic guidelines for the airport's overall development, maintenance, and operation for the next 20 years.

The master plan is intended to be a proactive document which identifies and then plans for future facility needs well in advance of the actual need for the improvements. This is done to ensure that the City of Albuquerque and its Aviation Department can coordinate environmental reviews, project approvals, design, financing, and construction to maintain and operate safe, adequate, and efficient facilities.

This study will follow a systematic approach outlined by the Federal Aviation Administration (FAA) to identify existing and future airport needs. The intended result is a recommended development concept which outlines the proposed uses for all areas of airport property. This master plan update will differ from those before in that the analysis will include airport sustainability measures. The sustainability analysis will include a baseline assessment outlining historical and current sustainability achievements, as well as integration of proposed sustainability goals and objectives into future airport plans.

The City of Albuquerque recognizes the importance of air transportation to its community and the surrounding region, as well as the associated challenges inherent in providing for its unique operating and improvement needs. The cost of maintaining an airport is an investment which yields impressive benefits that time and again have proven to be greater than the costs. A sound and realistic master plan will position the airport to maintain its role as an important link in the national air transportation system for regional users, as well as maintain the existing public and private investments in its facilities.

MASTER PLAN GOALS AND OBJECTIVES

The primary objective of the sustainable airport master plan (SAMP) is to provide the community, City of Albuquerque, and its airport administration with proper guidance for future improvements and processes that incorporate sustainability principles in addressing aviation demand and airport operations in a manner that is wholly compatible with the environment. Making sustainability a part of the core objective of the planning process will promote design, project implementation, and financial decisions that will help the airport identify ways to reduce energy consumption, environmental impacts, and carbon footprint. As a result of incorporating sustainability issues into the master planning process, the airport can become a more environmentally friendly economic center and neighbor. The plan will benefit all residents of the area by providing a single comprehensive plan which supports and balances aviation activities and the environmental preservation of the surrounding environs.

Accomplishing this objective requires an evaluation of the existing airport to determine what actions should be taken to maintain an adequate, safe, and reliable airport facility. The sustainable airport master plan will produce a development plan which will provide airport officials with a program for future capital needs to aid in planning, scheduling, and budgeting.

An airport master plan must be developed in accordance with FAA requirements; however, the plan can also be prepared in a manner which makes it useful in strategic planning for the airport. The FAA requires specific components within a master plan. The components, to be detailed in the following section, are guidelines which allow for a systematic and technical approach to reach the final recommended plan.

This sustainable master plan provides a vision for the airport covering the next 20 years and, in some cases, beyond. With this vision, the City of Albuquerque will have advance notice of potential future airport funding needs so that appropriate steps can be taken to ensure that adequate funds are budgeted and planned accordingly.

The specific objectives considered in the sustainable airport master plan include:

- To review the Aviation Department's sustainability policy mission statement;
- To define sustainability categories at the airport and conduct a baseline inventory and assessment;
- To research and evaluate transportation industry and socioeconomic factors likely to affect the air transportation demand in the region;
- To determine the projected needs of airport users through the year 2035;

- To establish measurable goals to minimize the impact on consumption, and to identify specific sustainability initiatives to help in achieving each goal;
- To recommend improvements that will enhance the airport's safety, efficiency, and capability to serve the community's aviation needs;
- To establish a schedule of priorities and a financial plan for the improvements proposed by this master planning effort;
- To determine the required level of environmental documentation to move forward with each recommendation of the master plan;
- To prepare an updated Airport Layout Plan in accordance with FAA guidelines and incorporate GIS databases; and
- To incorporate an active and productive public involvement and community outreach program throughout the sustainable master planning process.

AIRPORT GUIDING PRINCIPLES

The Albuquerque International Sunport has established the following guiding principles:

Mission Statement

Plan and deliver premier aviation services that contribute positively to Albuquerque and New Mexico by assuring a safe, pleasurable airport experience for passengers and quality services for our customers.

Vision Statement

The Albuquerque International Sunport is a leading center for worldwide transportation that advances local, regional, and international commerce and creates an authentic southwestern travel experience.

The Albuquerque International Sunport is a leading center for worldwide transportation that advances local, regional, and international commerce and creates an authentic southwestern travel experience.

Values and Beliefs

- Overall Excellence – We are proud of our leadership team for excellence in aviation and public services.
- Financial Responsibility – Our accurate, timely reporting and management of finances assures and maximizes value for airport stakeholders.
- Customer – Our outstanding services are courteous, professional, and responsive to customer needs.
- Community Relationships – As a good neighbor, we build community relationships based on mutual trust and open communication.
- Employee Well-Being – We appreciate, respect, and value all employees at all job levels.
- Operational Effectiveness – We complete quality work on time and in a cost-effective manner.
- Risk, Safety, and Environment – We continuously improve safety and minimize risk for our employees, contract partners, and the traveling public.

Sustainability Policy Statement

The City of Albuquerque Aviation Department will be increasingly sustainable with regard to natural resource conservation, economic strength, and community contributions.

The City of Albuquerque Aviation Department will be increasingly sustainable with regard to natural resource conservation, economic strength, and community contributions.

INTRODUCTION TO SUSTAINABILITY

Sustainability is an ingrained concept to the City of Albuquerque. With its AlbuquerqueGreen program, the city is continuously working to provide a place where the "well-being of current and future citizens is supported by a vibrant economy and a self-renewing, healthy environment." The first step in this process is to understand that sustainability, in practice, means day-to-day recognition that economy, society, and environment are interconnected. The city has already achieved success receiving recognition from the U.S. Chamber of Commerce and Siemens with a Sustainable Community Award for its vision and tools for energy conservation, clean energy production and use, and conservation technologies. The city has also received a World Leadership Award for its efforts to secure a sustainable water supply.

The commissioning of this Sustainability Airport Master Plan is evidence that the City of Albuquerque Aviation Department is furthering the efforts of the city to demonstrate leadership by making wise and innovative choices to ensure Albuquerque is a sustainable community. This Sustainable Airport Master Plan integrates sustainability and commits the Sunport to a long-term, comprehensive, and integrated approach that is guided by the Aviation Department's Sustainability Policy Statement, which is to be "increasingly sustainable with regard to natural resource conservation, economic strength, and community contributions." Ultimately, the city's Aviation Department intends to implement sustainability programs with the goal of operating the "greenest" airport system in the country.

The Aviation Department's priorities as outlined in its *Sustainability Policy Statement* include:

- "The Department will achieve its transportation and economic mission in a manner that demonstrates responsible stewardship with a focus on water conservation, minimizing greenhouse gas emissions, and innovation.
- As it implements proactive sustainable management and practices that continually improve the environment, the Department will contribute to the economic, social, and environmental well-being of the City of Albuquerque and the region.
- The Department will fully comply with all applicable environmental laws, regulations, and other requirements, and will exceed legal and regulatory standards where appropriate.
- The Department will influence tenants to encourage active participation in the sustainability efforts."

The Aviation Department's management approach to sustainability includes the following guiding principles:

- **"Establishing Environmental Goals and Targets –** Using innovative technologies and best management practices, the Department will develop, monitor, and regularly review specific activities and programs that improve environmental performance.
- **Achieving Continual Environmental Improvement –** The Department will strive to continually reduce the impacts of operations so that it preserves and protects surrounding natural resources through cost-effective energy use, recycling, water conservation, waste reduction, pollution prevention activities, and procurement of green materials.
- **Using Sustainability in Business Decisions –** The Department will seek to enhance the sustainability of its airports by incorporating sustainability into daily business decisions."

WHAT IS SUSTAINABILITY?

In its broadest sense, sustainability has been defined by The Brundtland Commission (the World Commission on Environment and Development) as, "development that meets the needs of current generations without compromising the ability of future generations to meet their own needs." However, the most applicable definition of sustainability for the Albuquerque International Sunport has been established by the Airports Council International-North America (ACI-NA), which defines sustainability as: "A holistic approach to managing an airport so as to ensure the integrity of the **E**conomic viability, **O**perational efficiency, **N**atural resource conservation, and **S**ocial responsibility [EONS] of the airport" (see **Figure A**).

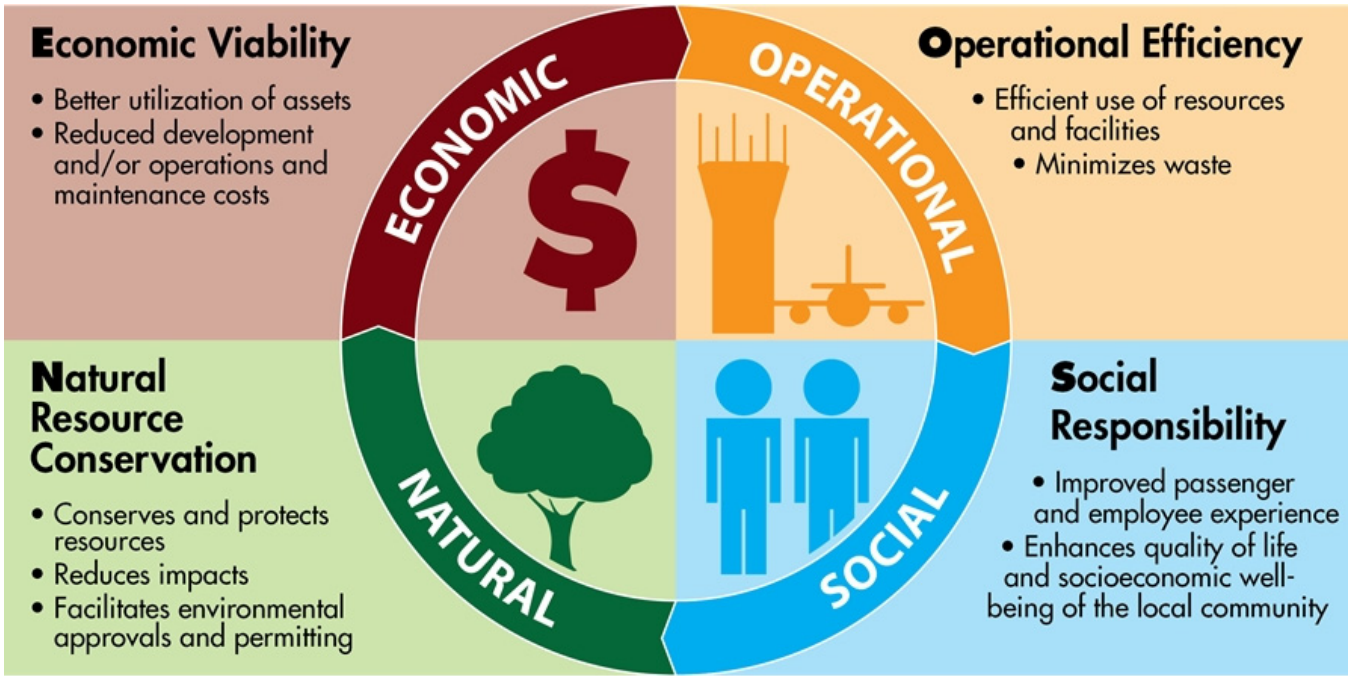

Economic Viability
• Better utilization of assets
• Reduced development and/or operations and maintenance costs
ECONOMIC
OPERATIONAL
Operational Efficiency
• Efficient use of resources and facilities
• Minimizes waste
Natural Resource Conservation
• Conserves and protects resources
• Reduces impacts
• Facilitates environmental approvals and permitting
NATURAL
SOCIAL
Social Responsibility
• Improved passenger and employee experience
• Enhances quality of life and socioeconomic well-being of the local community

Figure A: ACI-NA's EONS Approach to Sustainability

ACI-NA's definition is more applicable because of its focus on airports and its inclusion of the operational aspects of an airport. Operational efficiency as it relates to sustainability can be described as:

> **Operational Efficiency –** an airport's management structure and ability to leverage operations and maintenance monies to promote efficient use of resources and minimize waste.

The Sunport's *Sustainability Management System Reference Document*, which was prepared in November 2008, defines the remaining three sustainability categories as:

> **Economic Viability -** "Refers to the continued business viability of an airport enterprise, the tangible assets created by capital investments at the airport, and the direct and indirect economic impact on the region. This impact includes the value added to public and private sectors through investments in partnerships, tax payments, and other contributions."
> **Natural Resource Conservation** - "Refers to the natural resources that are used or affected as a result of airport operations and the ecosystem in which these resources are located."
> **Social Responsibility** – "Refers to contributions to the surrounding community via practices that promote social interaction and the cultural enrichment of the region."

Sustainability, as part of an organizational strategy, has demonstrated measurable benefits at airports across the world including:

- Improved passenger experience;
- Better use of assets;
- Reduced development and/or operations and maintenance costs;
- Reduced environmental/ecological footprint;
- Facilitation of environmental approvals/permitting;
- Improved relationships within communities;
- Enhancement of regional economies;
- Creation of an engaged and enriched place to work; and
- Creation and utilization of new technologies through increased demand and investment in technologies that facilitate sustainable solutions.

SUSTAINABILITY AND THE FEDERAL AVIATION ADMINISTRATION

In recognition of the Sunport's commitment to sustainability, the airport received a grant through the Federal Aviation Administration's (FAA's) Airport Improvement Program to prepare a Sustainable Airport Master Plan. The FAA's program provides funding for the preparation of sustainable master plans or sustainable management plans which integrate sustainability principles into the airport planning process. These plans make sustainability a central focus in the planning process, generating strategies for achieving economic benefits, enhancing operational efficiency, increasing community awareness and involvement, and reducing negative environmental impacts. Further information on the FAA's approach to sustainable master planning can be accessed at:
http://www.faa.gov/airports/environmental/sustainability/.

THE MASTER PLAN AND THE SUSTAINABILITY PLANNING PROCESS

The sustainability airport master planning process integrates sustainability planning elements into the traditional airport master plan process (see **Figure B**). When combined, the sustainability and master planning processes provide the flexibility necessary to consider the Sunport's operational and financial constraints. They also provide a powerful planning tool that will create a long-term development vision for the Sunport that considers sustainability performance measures. The purpose of the unified approach is to:

- Ensure goals and initiatives developed as part of the sustainability planning process are used to drive the recommendations of the master plan; and
- Ensure standalone sustainability strategies are not at odds with the recommendations of the master planning process.

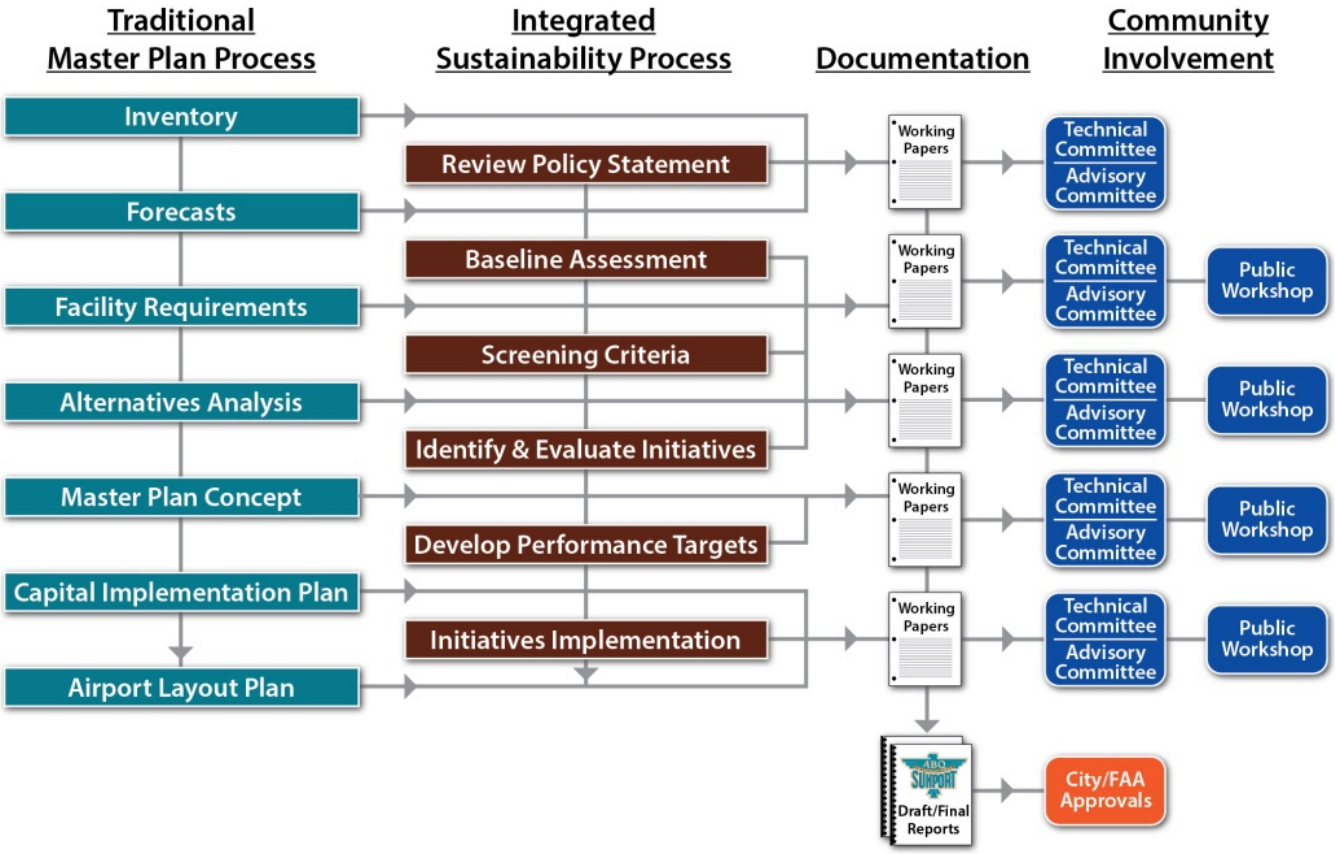


Figure B: Integration of sustainability into the master planning process

The sustainability planning process incorporates input from three main stakeholder groups: 1) City and Sunport leadership; 2) the study's Technical Committee (TC) and Advisory Committee (AC); and 3) Sunport tenants, such as airlines, concessionaires, and fixed base operators (FBOs). Each committee was composed of no more than 20 members and included representatives from the City, airport tenants and pilot organizations, and regional economic and planning organizations, among others.

PUBLIC PARTICIPATION

The Albuquerque International Sunport Sustainable Airport Master Plan is of interest to many within the region. This includes local citizens, community organizations, airport users, airport tenants, area-wide planning agencies, and aviation organizations. As the Airport is a strategic component of the regional, state, and national aviation systems, the Sunport Master Plan is of importance to both state and federal agencies responsible for overseeing air transportation.

The City identified a group of community members and aviation interest groups to act in an advisory role in the development of the Albuquerque Sustainable Airport Master Plan. To assist in the review process, draft working papers were prepared at various milestones in the planning process. The working paper process allowed for timely input and review during each step of the planning process to ensure that all planning issues could be fully addressed as the recommended program developed. Members of the advisory committee reviewed draft working papers and provided comments throughout the process to help ensure that a realistic, viable plan evolved.

A series of public information workshops were also held as part of the coordination effort. The public information workshops were designed to allow any and all interested persons to become informed and provide input concerning the Albuquerque Sustainable Airport Master Plan process. Notices of meeting times and locations were advertised through local media, as well as social media outlets. The same draft working papers provided to the advisory committee were made available to the public at www.theSunport.airportstudy.com.

SUMMARY AND RECOMMENDATIONS

Defining demand that might reasonably be expected over the useful life of an airport's key components (e.g., runways, taxiways, terminal buildings, etc.) is an important factor in facility planning. In airport master planning, this typically involves projecting potential aviation activity for a 20-year timeframe. Aviation demand forecasting for Albuquerque International Sunport must consider commercial passenger service, air cargo, based aircraft, and aircraft operational activity forecasts, including military operations associated with Kirtland Air Force Base (AFB).

The cyclical nature of the economy makes it virtually impossible to predict with certainty year-to-year fluctuations in activity when looking 5, 10, and 20 years into the future. Cost-effective, efficient, and orderly development of an airport should rely more upon its actual demand than on a time-based forecast figure. To develop a master plan that is demand-based rather than time-based, a series of planning horizon milestones were established that take into consideration the reasonable range of aviation demand projections. The planning horizons will be segmented as the Short-Term (approximately years 0-5), the Intermediate-Term (approximately years 6-10), and the Long-Term (years 11-20 and possibly beyond).

Exhibit iA presents a summary of the planning horizons developed for this plan. The forecasts used to establish the planning horizons were approved by the FAA in May 2015. A copy of the approval letter is included in **Appendix C**. Due to the extended master plan review and approval process, the City Administration requested a more current set of activity statistics be included for reference. The activity statistics for the calendar year 2018 have been included in **Exhibit iA** as well as **Exhibit 2N** in the report to provide updated reference.

The 2018 passenger enplanements of 2.74 million effectively met the intermediate term planning horizon. It should be noted that terminal planning in this master plan factored in a high range of 3.83 million enplanements, over 15 percent above the long-term planning horizon of 3.3 million.

SUSTAINABILITY GOALS

In 2008, the Aviation Department commissioned a sustainability management system intended to incorporate sustainability into their daily business decisions. The stated goal of the Aviation Department is to operate the "greenest" airport system (including both the Sunport and Double Eagle II Airport) in the country. The plan was prepared a full two years prior to the FAA's memorandum announcing its Airport Sustainable Master Plan Pilot Program, demonstrating the progressive attitude of the Department in being at the forefront of the airport sustainability movement.

The stated goal of the Aviation Department is to operate the "greenest" airport system (including both the Sunport and Double Eagle II Airport) in the country.

Chapter Three - Baseline Assessment provides a look into the Sunport's current sustainability performance as determined by its related activities, policies, and procedures. This evaluation was an important first step in the development of the Sunport's long-term sustainability strategy to enable the Aviation Department to focus its future sustainability work on areas that are of importance and interest to the Sunport and the city, thereby ensuring the efficient use of limited resources. It will also enable the Aviation Department to measure, through existing and new metrics, its overall sustainability performance over time as well as the impact of individual initiatives.

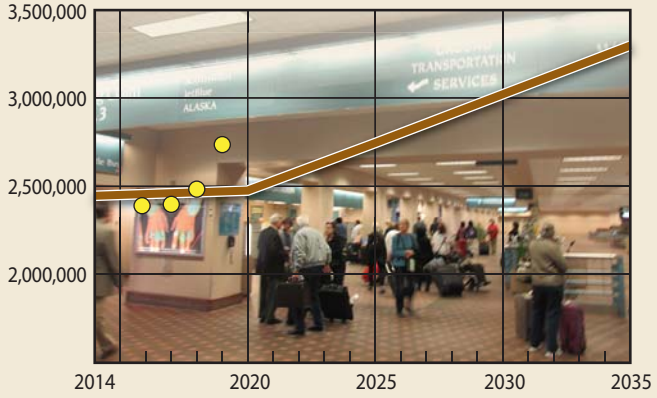
At the onset of the SAMP, it was determined that the sustainability baseline assessment would focus on six categories. In accordance with FAA guidelines, three categories were predetermined during the project scoping process to involve detailed studies including:

- Waste management and recycling,
- Energy, and
- Air quality and greenhouse gas (GHG) emissions.

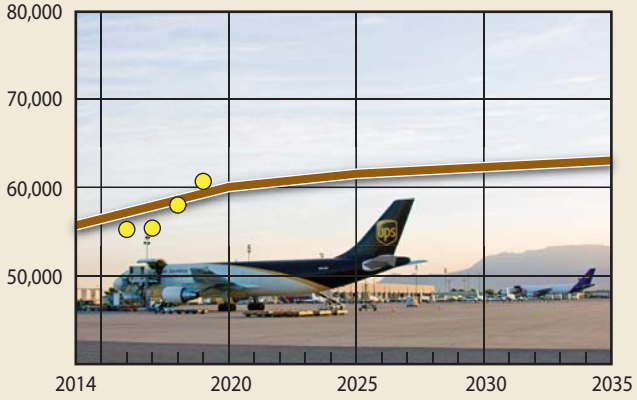
Three additional categories were selected based upon discussions with Aviation Department staff and surveys of airport tenants. The selected additional categories include:

	Base Year 2014	Actual 2018	Short-Term	Intermediate-Term	Long-Term
TOTAL ENPLANEMENTS					
ANNUAL ENPLANEMENTS	***2,446,388***	***2,737,309***	***2,490,000***	***2,750,000***	***3,330,000***
TOTAL AIR					
AIR CARGO (tons)	***55,702***	***60,630***	***60,043***	***61,534***	***63,043***
ANNUAL OPERATIONS					
ITINERANT OPERATIONS					
Air Carrier	57,172	58,858	56,600	61,000	70,000
Air Cargo	10,202	10,188	10,500	10,900	11,600
Other Air Taxi	12,304	15,982	13,200	13,900	15,800
General Aviation	28,548	30,701	29,300	31,600	36,200
Military	16,683	14,540	16,100	16,100	16,100
TOTAL ITINERANT OPERATIONS	*124,909*	*130,269*	*125,700*	*133,500*	*149,700*
LOCAL OPERATIONS					
General Aviation	2,930	8,845	3,100	3,200	3,500
Military	2,230	4,930	2,800	2,800	2,800
Total Local Operations	*5,160*	*13,775*	*5,900*	*6,000*	*6,300*
TOTAL OPERATIONS	***130,069***	***144,044***	***131,600***	***139,500***	***156,000***
BASED AIRCRAFT	***165***	***158***	***170***	***190***	***220***

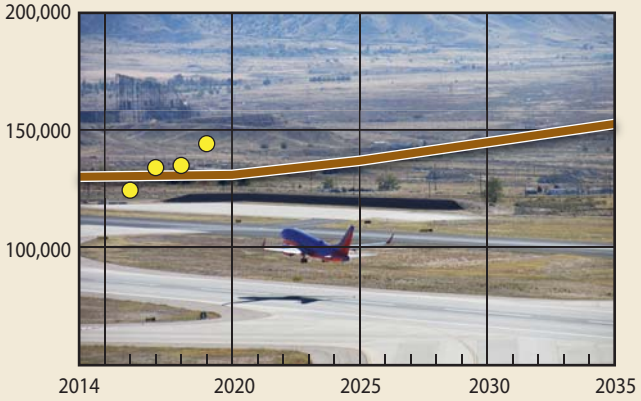
PASSENGER ENPLANEMENTS FORECAST



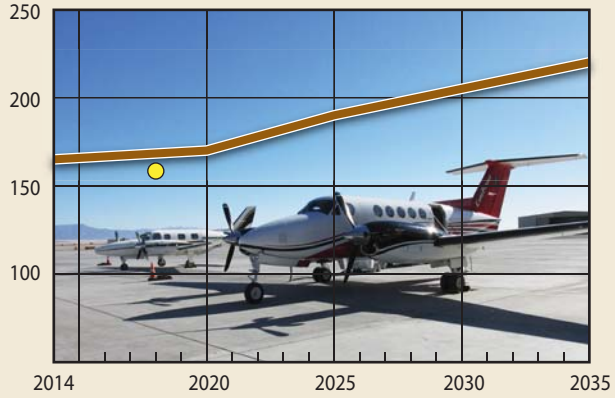
AIR CARGO SHIPMENT FORECAST (TONS)



AIRCRAFT OPERATIONS FORECAST



BASED AIRCRAFT FORECAST



○ Denotes annual activity since the base year.

- Water conservation and water quality,
- Surface transportation, and
- Natural resource management.

A baseline assessment was conducted for each priority category to benchmark its sustainability performance, as determined by past and current activities, policies, and procedures. Through this process, along with feedback obtained from stakeholders, sustainability goals and objectives were established to reflect the unique operating conditions of the Sunport and align with the environmental priorities of the City of Albuquerque, State of New Mexico, and larger airport industry. The following highlights the Sunport's goals for each priority sustainability category:

Waste Management and Recycling – Expand the Sunport's existing waste management program to divert waste from landfills through increased recycling, composting, and procurement policies.

Energy – Expand energy efficiency measures and renewable energy opportunities.

Air Quality and Greenhouse Gas (GHG) Emissions – Commit to the betterment of regional air quality by supporting efforts to reduce greenhouse gas emissions from Sunport users and enacting policies to reduce emissions from Aviation Department-controlled sources.

Water Conservation and Water Quality – Reduce potable water consumption throughout the Sunport with expanded efficiency measures and reclaimed/grey water use.

Surface Transportation – Promote the utilization and expansion of alternative transportation modes to and from the Sunport.

Natural Resource Management – Incorporate procurement and construction policies to prioritize the use of more sustainable resources.

PROPOSED MASTER PLAN CONCEPT

The updated concept master plan ensures that the Sunport can maintain its vision "*as a leading center for worldwide transportation that advances local, regional, and international commerce and creates an authentic southwestern travel experience"* and is driven by its mission statement: *"Plan and deliver premier aviation services that contribute positively to Albuquerque and New Mexico by assuring a safe, pleasurable airport experience for passengers and quality services for our customers."*

Chapter Four – Facility Requirements outlines the basic needs of the airport through the planning period. Primary airfield needs include addressing design standard deficiencies; mitigating "hot spots" and taxiway geometry issues; and identifying excess pavements. The primary passenger terminal complex considerations included reserving space for long-term terminal expansion, planning for changing needs in ticketing and bag screening, and identifying locations for concessions expansion. Other important elements included air cargo expansion, locations in the general aviation area for adding conventional

hangars and apron to accommodate heavier aircraft, location for a future ARFF facility, and options for highest and best use of specific parcels for revenue support.

The recommended master plan concept, as shown on **Exhibit iB**, presents a long-term configuration for the airport that preserves and enhances the role of the airport while meeting FAA design standards. The major features include the following:

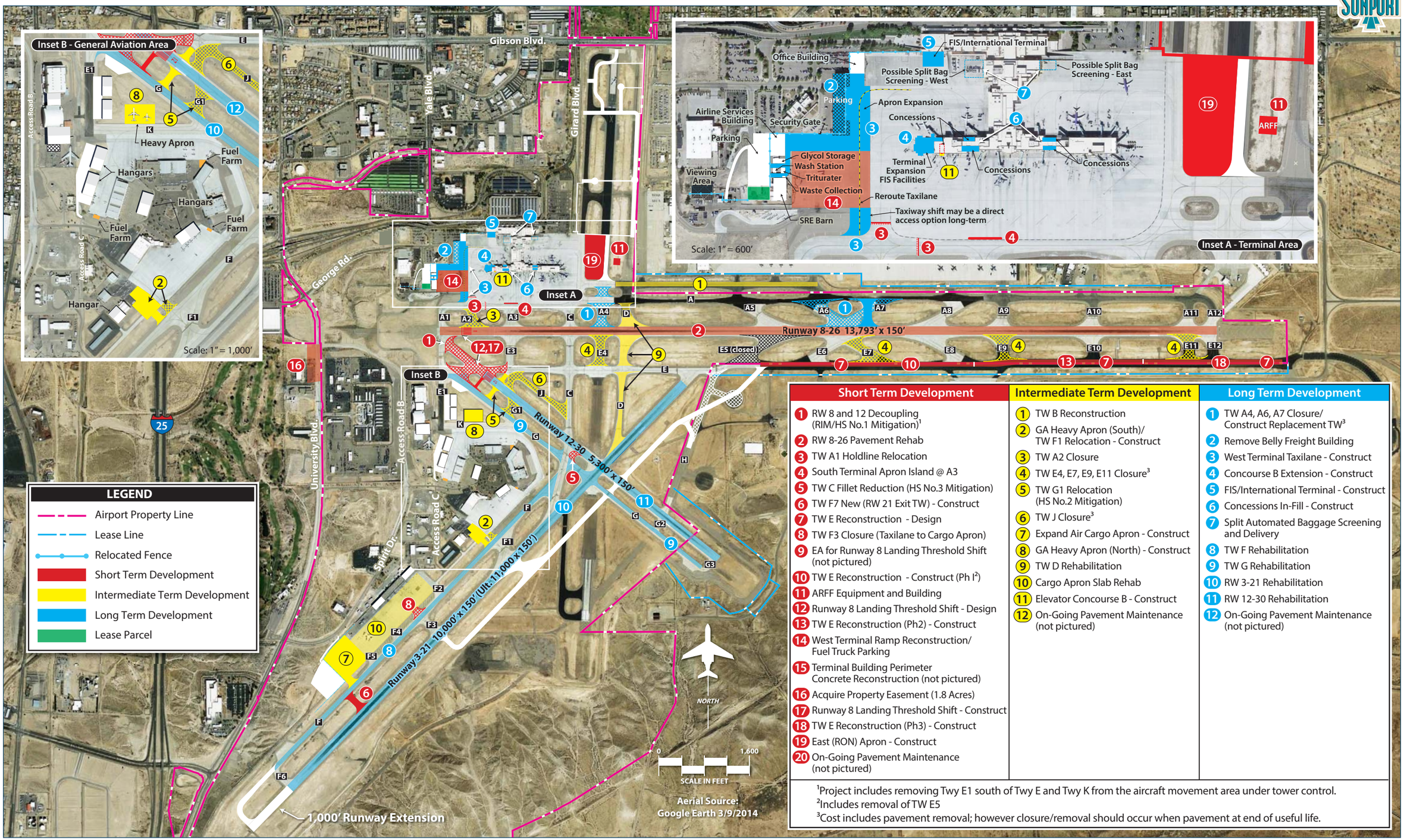
Runway 8 and Runway 12 threshold reconfiguration – The reconfiguration of these two thresholds will resolve issues related to safety standards. The Runway Safety Action Team (RSAT) previously identified the convergence of the two runways as a hot spot with high potential for runway incursions. The initial solution is to relocate the Runway 12 threshold with marking, lighting, and signage changes. In addition, aircraft holding to depart on Runway 8 for departure penetrates the approach surface to the runway's displaced landing threshold. To avoid losing the primary instrument approach to the Sunport, the hold line will need to be relocated out of this approach surface as soon as possible. This will increase delays in taxiing to the end of the runway for departure as well as create congestion and inefficiencies along Taxiway A and the terminal apron.

The permanent solution will relocate the Runway 8 landing threshold 600 feet west. This will reduce the taxi to the departure threshold and minimize the other circulation inefficiencies. In addition, the refueling station will be removed from the runway protection zone. This will be combined with relocating the Runway 12 threshold 600 feet southeast, which removes all holding aircraft from approach surfaces and critical areas of both runways.

Taxiway geometry improvements – Several taxiway geometry improvements are recommended to remove other hot spots as well improve efficiency. Taxiway G1 is identified as a hot spot as it provides direct access from a general aviation apron to Runway 12-30. Relocation of the taxiway slightly northwest as a right-angle taxiway will eliminate this hot spot. A wide expanse of pavement at the convergence of Taxiways C, G, F, and Runway 12-30 created another hot spot that can be confusing to both pilots and ground vehicle operators. This can be mitigated by reducing the pavement to a standard taxiway size.

Other taxiways providing direct access to a runway from aprons include Taxiway A3 from the terminal apron and Taxiway F3 from the air cargo apron. Taxiway A3 will be marked as closed until the west terminal taxilane is relocated slightly west to eliminate the direct access. Taxiway F3 from the air cargo apron to Taxiway F will be closed permanently. An additional taxiway exit from Runway 3-21 is also planned to reduce delays and taxi distance, particularly for aircraft landing on Runway 21.

Airfield pavements that may be removed from service – To reduce future maintenance and rehabilitation costs, pavements were identified that could be removed without significantly impacting safety, efficiency, or capacity. These include Taxiways A4, E4, E7, E9, and E11. In addition, high speed exits A6 and A7 are recommended to be replaced by a single right-angled exit.



Short Term Development

1. RW 8 and 12 Decoupling (RIM/HS No.1 Mitigation)[1]
2. RW 8-26 Pavement Rehab
3. TW A1 Holdline Relocation
4. South Terminal Apron Island @ A3
5. TW C Fillet Reduction (HS No.3 Mitigation)
6. TW F7 New (RW 21 Exit TW) - Construct
7. TW E Reconstruction - Design
8. TW F3 Closure (Taxilane to Cargo Apron)
9. EA for Runway 8 Landing Threshold Shift (not pictured)
10. TW E Reconstruction - Construct (Ph I[2])
11. ARFF Equipment and Building
12. Runway 8 Landing Threshold Shift - Design
13. TW E Reconstruction (Ph2) - Construct
14. West Terminal Ramp Reconstruction/ Fuel Truck Parking
15. Terminal Building Perimeter Concrete Reconstruction (not pictured)
16. Acquire Property Easement (1.8 Acres)
17. Runway 8 Landing Threshold Shift - Construct
18. TW E Reconstruction (Ph3) - Construct
19. East (RON) Apron - Construct
20. On-Going Pavement Maintenance (not pictured)

Intermediate Term Development

1. TW B Reconstruction
2. GA Heavy Apron (South)/ TW F1 Relocation - Construct
3. TW A2 Closure
4. TW E4, E7, E9, E11 Closure[3]
5. TW G1 Relocation (HS No.2 Mitigation)
6. TW J Closure[3]
7. Expand Air Cargo Apron - Construct
8. GA Heavy Apron (North) - Construct
9. TW D Rehabilitation
10. Cargo Apron Slab Rehab
11. Elevator Concourse B - Construct
12. On-Going Pavement Maintenance (not pictured)

Long Term Development

1. TW A4, A6, A7 Closure/ Construct Replacement TW[3]
2. Remove Belly Freight Building
3. West Terminal Taxilane - Construct
4. Concourse B Extension - Construct
5. FIS/International Terminal - Construct
6. Concessions In-Fill - Construct
7. Split Automated Baggage Screening and Delivery
8. TW F Rehabilitation
9. TW G Rehabilitation
10. RW 3-21 Rehabilitation
11. RW 12-30 Rehabilitation
12. On-Going Pavement Maintenance (not pictured)

[1]Project includes removing Twy E1 south of Twy E and Twy K from the aircraft movement area under tower control.
[2]Includes removal of TW E5
[3]Cost includes pavement removal; however closure/removal should occur when pavement at end of useful life.

This page intentionally left blank

Passenger terminal improvements – Some functional elements of the terminal building should be improved to serve forecast demand. Concourse B is planned to be extended to the west for two additional aircraft gates. Additional concessions space is also planned as well as improved Federal Inspections Services (FIS). In concert with the concourse extension, the west terminal taxilane will be moved further west, requiring removal of the belly freight building. A new airline services building is planned for the west support area along with an office building. Additional apron is planned on the east side of the terminal to serve diversions and overnight aircraft.

Air cargo development – The air cargo facilities located at the southwest end of the Sunport are adequate through the short-term planning horizon. By the long-term planning period, there may be a need to expand the air cargo sort facility. Plans are included for accommodating additional building, apron, and truck parking.

General aviation development – Even with the availability of Double Eagle II Airport, there will be a continued presence of general aviation activity at the Sunport. There are two nationally known fixed base operators (FBO) located at the Sunport that cater to private business jets, private commercial type jets, and some transient military. In addition, there are two businesses that manufacture aircraft.

Both FBOs have experienced increasing activity by operators of larger aircraft with limited pavement of sufficient strength to support them. Areas have been identified for constructing higher-strength apron. Areas have also been identified for additional hangar development. Door heights suitable to accommodate the higher tail heights of many jets now used in general aviation are also recommended for some of the new hangars.

Non-Aviation/Commercial Support – The Aviation Department operates both airports without taxpayer support. To maintain competitive rates and charges for the airlines serving the airport as well as other aviation tenants, maximizing revenues derived from other uses compatible to the airport is important. The plan identifies several areas for non-aviation development which are depicted on **Exhibit iC** and discussed below:

- *Aviation Center of Excellence (ACE)* – With the closure of Runway 17-35, approximately 75 acres of land just northeast of the terminal complex became available for redevelopment. The ACE project is being developed to accommodate strategic aerospace and aviation innovations and partnerships. It will also host a convenience retail and restaurant development at the north end adjacent to Gibson Boulevard.
- *Puerto del Sol Golf Course* – This 72-acre site is located across Gibson Boulevard from the ACE development. Currently leased to the City Parks and Recreation Department for use as a municipal golf course. It is recommended to remain as a public golf course producing revenue for the airport fund for at least ten years until the ACE project is built out. At that time, the property should be reviewed again to determine its highest and best use.
- *Sunport Business and Technology Center* – This 65-acre site is located to the east of University Boulevard, west of Spirit Drive, and south of Clark Carr Road. It is designated as a Foreign Trade Zone (FTZ), but currently has only 6.5 acres leased. Analysis as part of this master plan

recommends a different realignment of a proposed north-south internal road to provide more depth to the topographically challenged lease areas. Land use recommendations include commercial retail, light industrial, and educational

- *Property West of ACE* – This 12-acre site is located to the south of Miles Road and west of Girard Boulevard. It is to the west of the ACE project and is envisioned as an extension of that project. The plan considered shows one parcel each for office and light industrial uses and maintains the two-acre green space which currently contains a multi-use trail running north-south along the east edge of the property.
- *Property at the Northeast Corner of Sunport and University Boulevards* – This 25-acre parcel is part of former Yale Landfill (1948-1965) and is located within a designated landfill buffer zone. Future uses on this site that require the least remediation include a solar farm and parking lot. Solar farm projects will require a Glint and Glare Study to assess the feasibility of this use. These uses will still need to address the issue of continuous settling.
- *Property at the Southeast Corner of Sunport and University Boulevards* – This 80-acre parcel is also part of former Yale Landfill (1948-1965) and is located within a designated landfill buffer zone. As with the previous site, future uses are limited without significant remediation. In addition, most of this site is within the runway protection zone of Runway 8, which further limits its use.
- *Property West of University Boulevard* – This nine-acre parcel is located just west of the Yale Landfill and within the Landfill Buffer Zone. A detention pond on the northern triangular portion of the property is needed for stormwater purposes. At least two acres of the site will be within the future runway protection zone to Runway 8. Options for future uses on this site are greater than those available for properties east of University Boulevard; however, the site is subject to special city review due to its location within a landfill buffer zone. As a result, this property will require special consideration of any impact from the former Yale Landfill.

City Administration Actions – As the sustainable airport master plan entered the approval phase, the 2017 mayoral election ushered in a new City Administration late in the year. The City Administration has initiated efforts related to the Sunport in the following areas:

- More active pursuit of new airline flights,
- A more robust use of the terminal to display art and provide a representation of the community to arriving passengers, and
- More interaction with adjoining land use planning to create a high-tech economic zone that extends from the Veterans Administration (VA) Hospital at Kirtland AFB on the north side of the Sunport to Mesa Del Sol south of the Sunport.

CAPITAL IMPROVEMENT PLAN AND COST SUMMARIES

From the specific needs and improvements that have been established for the Sunport, a realistic schedule and the associated costs for implementing the plan were determined. The implementation plan

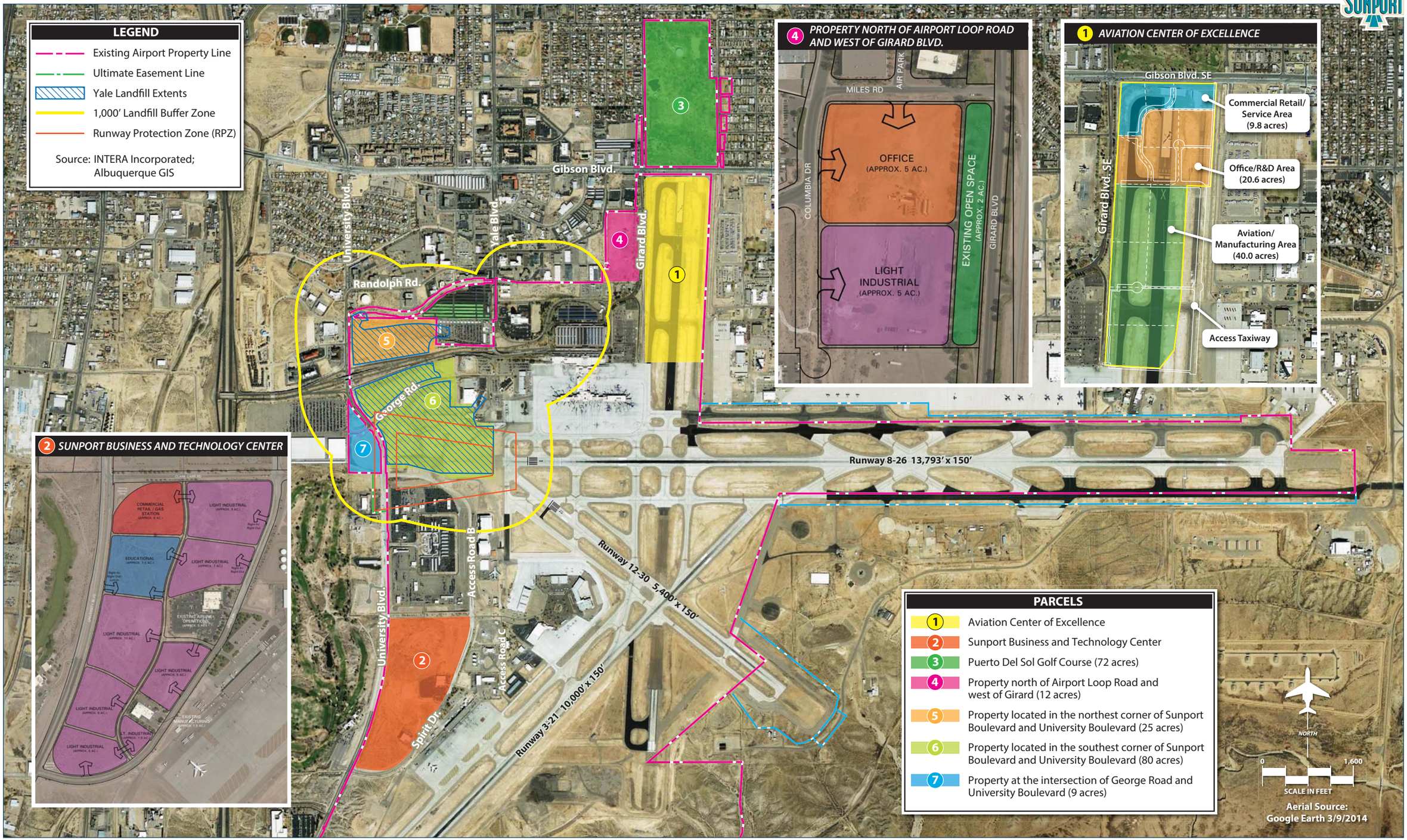

LEGEND
Existing Airport Property Line
Ultimate Easement Line
Yale Landfill Extents
1,000' Landfill Buffer Zone
Runway Protection Zone (RPZ)
Source: INTERA Incorporated; Albuquerque GIS
4 PROPERTY NORTH OF AIRPORT LOOP ROAD AND WEST OF GIRARD BLVD.
MILES RD
AIR PARK
COLUMBIA DR
OFFICE (APPROX. 5 AC.)
LIGHT INDUSTRIAL (APPROX. 5 AC.)
EXISTING OPEN SPACE (APPROX. 2 AC.)
GIRARD BLVD
1 AVIATION CENTER OF EXCELLENCE
Gibson Blvd. SE
Girard Blvd. SE
Commercial Retail/ Service Area (9.8 acres)
Office/R&D Area (20.6 acres)
Aviation/ Manufacturing Area (40.0 acres)
Access Taxiway
2 SUNPORT BUSINESS AND TECHNOLOGY CENTER
COMMERCIAL RETAIL / GAS STATION (APPROX. 8 AC.)
LIGHT INDUSTRIAL (APPROX. 5 AC.)
EDUCATIONAL (APPROX. 7.5 AC.)
LIGHT INDUSTRIAL (APPROX. 7 AC.)
EXISTING AIRLINE OPERATIONS (APPROX. 5 AC.)
LIGHT INDUSTRIAL (APPROX. 10 AC.)
LIGHT INDUSTRIAL (APPROX. 5 AC.)
LIGHT INDUSTRIAL (APPROX. 8 AC.)
EXISTING MANUFACTURING (APPROX. 1.5 AC.)
LT. INDUSTRIAL (APPROX. 1.5 AC.)
LIGHT INDUSTRIAL (APPROX. 5 AC.)
Gibson Blvd.
University Blvd.
Yale Blvd.
Girard Blvd.
Randolph Rd.
George Rd.
Runway 8-26 13,793' x 150'
Runway 12-30 5,400' x 150'
Runway 3-21 10,000' x 150'
Access Road B
Access Road C
Spirit Dr.
PARCELS
1 Aviation Center of Excellence
2 Sunport Business and Technology Center
3 Puerto Del Sol Golf Course (72 acres)
4 Property north of Airport Loop Road and west of Girard (12 acres)
5 Property located in the northest corner of Sunport Boulevard and University Boulevard (25 acres)
6 Property located in the southest corner of Sunport Boulevard and University Boulevard (80 acres)
7 Property at the intersection of George Road and University Boulevard (9 acres)
NORTH
0
1,600
SCALE IN FEET
Aerial Source: Google Earth 3/9/2014

Exhibit iC
NON-AVIATION LAND USE PLAN

This page intentionally left blank

considers the interrelationships among the projects in the recommended plan in order to determine a logistics sequence to minimize conflicts and establish a master schedule.

The capital improvement plan (CIP) covers the same years as the forecasts in the planning effort. The Short-Term is programmed annually through the first five years of the plan. The remaining projects are grouped into Intermediate- (years 6-10) and Long- (years 11-20) Term planning horizons. By utilizing planning horizons instead of specific years for Intermediate- and Long-Term development, the Sunport will have greater flexibility to adjust capital needs as demand dictates. **Exhibit iB** also presents the staging of the master plan projects color-coded by short-term, intermediate-term, and long-term planning horizons.

Table IA
Master Plan Capital Improvement Summary
Albuquerque International Sunport

	Project Cost	AIP Eligible (84.29%)	Local Share
Short-Term (0-5 Years)	$59,127,000	$49,838,148	$9,288,852
Intermediate-Term (6-10 Years)	$27,517,000	$23,194,079	$4,322,921
Long-Term (11-20 Years)	$39,005,000	$28,157,075	$10,847,925
TOTAL	$125,649,000	$101,189,302	$24,459,698

Table IA presents the recommended CIP and its corresponding cost estimates in 2018 dollars. The estimates also include contingencies, design costs, and construction management costs. As shown in the table, the CIP is estimated at approximately $125.6 million, with 101.2 million available for federal funding through the FAA-administered Airport Improvement Program.

SUSTAINABILITY PLAN

Through the sustainable airport master plan process, the Sunport's current sustainability performance was outlined, and specific goals and objectives were identified. For the Aviation Department to better gauge and measure its sustainability performance and to drive progress towards achieving the identified sustainability goals and objectives, it was necessary to identify quantifiable performance targets. Multiple performance targets, which are tied to the planning horizons of this Master Plan, have been identified for each resource category.

Key performance indicators (KPIs) are the specific, results-based metrics that allow the Aviation Department to gauge sustainability performance and progress toward overall goals. If KPIs are trending positively toward the overall goal, this indicates the specific initiatives that have been put into place are producing desired results; however, if KPIs trend negatively, then this is an indication that the Aviation Department needs to refocus on that specific area and identify opportunities for improvement. Sustainability performance targets and KPIs are outlined in **Table IB**. The primary intent of this effort is to set targets that are realistic and achievable, but still push the Aviation Department to make significant strides toward improving the sustainability performance of the Sunport.

TABLE IB
Sustainability Performance Targets
Albuquerque International Sunport

Targets	Key Performance Indicators
Goal 1. Expand the Sunport's existing waste management program to divert more waste from landfills through increased recycling, composting, and procurement policies.	
Conduct biennial waste audits 100% participation by airlines in recycling program by 2020 100% participation by terminal food concessions in food waste composting by 2025	Weight (tons) of recycled materials/solid waste/composted materials Number of airlines participating in recycling program Number of food concessions participating in food waste composting program
Goal 2. Expand energy efficiency measures and renewable energy opportunities.	
Incorporate all recommended energy efficiency measures (EEMs) by 2025 Retrofit rental car photovoltaic (PV) system by 2025 Construct credit card parking lot PV system by 2030 Expand PV capacity to achieve net-zero energy use for all Aviation Department facilities (100% on-site renewables) by 2035	Energy use (kWhs)/month On-site energy generation (kWhs)/month Energy costs ($)/month
Goal 3. Commit to the betterment of regional air quality by supporting efforts to reduce greenhouse gas emissions from Sunport users and enacting policies to reduce emissions from Aviation Department controlled sources.	
Prepare annual greenhouse gas (GHG) emissions reports Achieve carbon-neutral growth from 2020 emissions levels for airport-controlled sources Transition to all-electric ground support equipment (GSE) by 2025 Transition to 100% alternative fuel/low-emission fleet vehicles by 2035	GHG emissions/year % of low/no emission equipment Number of alternative fuel/low-emission fleet vehicles Fuel usage by GSE and fleet vehicles/month
Goal 4. Reduce potable water consumption throughout the Sunport with expanded efficiency measures and reclaimed/grey water use.	
Replace all outdated fixtures in Aviation Department-controlled facilities by 2020 Install sub-metering for all concessionaires, cooling equipment, restrooms, and irrigation on mixed-use meters by 2025 Utilize 100% reclaimed/grey water for all landscape irrigation by 2025 Reduce average indoor water use per passenger from 2014 levels by 50 percent by 2030 (1.0 gallons per passenger)	Water use/month (per passenger) Reclaimed/grey water use/month Water costs/month (per passenger) Number of sub-meters installed
Goal 5. Promote the utilization and expansion of alternative transportation modes to and from the Sunport.	
Conduct annual surveys of Aviation Department, Sunport tenant employees, and passengers to identify travel modes Install electric vehicle (EV) charging stations in the public parking areas by 2020 Implement priority parking spaces for carpools and alternatively fueled vehicles by 2020 Install on-site end-of-trip bicycle facilities for employees by 2025 Construct alternative refueling station by 2035	Annual employee/passenger survey results Number of EV stations available Number of priority parking spaces for carpools and alternatively fueled vehicles Alternative fuel usage/month
Goal 6. Incorporate procurement and construction policies to prioritize the use of more sustainable resources.	
Establish a "Green" Procurement Program by 2020 Implement a "Green" Concessions Policy by 2020 Implement construction policy by 2020 to commit to LEED or equivalent design standards for all new major construction or renovation projects when applicable	Annual expenditures on purchases of sustainable and/or locally sourced materials. Number of concessionaires committed to the "Green" Concessions Policy Number of construction/renovation projects that include sustainable elements.

The Sunport has already begun to incorporate many sustainable programs and facilities, including on-site electricity generation and low-emission fleet vehicles, among many others. These programs and projects have contributed toward the overall sustainability of the airport and the entire community.

The overall sustainability plan has been established with input from Aviation Department staff, the master plan advisory committee, and interested members of the public. The result is a sustainability plan that allows the Aviation Department to continually progress towards its sustainability goals.

This sustainability plan is not intended to be a static document but should be routinely reviewed and updated to consider new opportunities and issues as they arise. While some of the sustainability objectives are one-off capital projects, others are programs that will operate continuously once implemented. To ensure the continued success of these programs, it will take buy-in from Aviation Department staff and, in some cases, tenants of the Sunport. Close coordination with all potential stakeholders is a key to the success of the program.

Ultimately, it is the responsibility of the entire Aviation Department to ensure sustainability is incorporated into everyday operations and decision-making processes. Many processes, procedures, and responsibilities for sustainability implementation have already been put in place. Coupled with the efforts to date, this sustainability master plan should support the Aviation Department in achieving its overall goal of operating one of the greenest airport systems in the country.

Chapter One

INVENTORY

Sustainable Airport Master Plan

Chapter One

INVENTORY

The initial step in the preparation of the Sustainable Master Plan for Albuquerque International Sunport (the Sunport, ABQ) is the collection of information pertaining directly to or influencing the Sunport and the area it serves. The information summarized in this chapter will be used in subsequent analyses within this study and includes:

- Background information related to the Greater Albuquerque Region, including descriptions of the local geography, regional climate, and surface transportation systems.

- Physical inventories and descriptions of current facilities and services offered at the Sunport. The analysis will include airfield and landside infrastructure and services as well as local and regional airspace, competing airport facilities, air traffic control, and aircraft operating procedures.

- Albuquerque International Sunport's role in regional, state, and national aviation systems. Development at the airport since the completion of the previous master plan will also be discussed.

- Socioeconomic data including population, employment, and income activity sectors will be analyzed. These sectors typically offer an indication of future trends that could influence commercial and general aviation activity at the Sunport.

- A review of existing local and regional plans and studies which will be utilized later in the process to determine their potential influence on the development and implementation of this sustainable airport master plan.

- Review of existing environmental conditions and sensitivities, on or near the Sunport, so as to be factored in the recommended development plan.

The information outlined in this chapter provides a foundation for all subsequent chapters. Much of the information was obtained through on-site inspections of the Sunport and interviews with Aviation Department staff, commercial operators, and other tenants. Information was also obtained from outside resources, including documents prepared by the Federal Aviation Administration (FAA), New Mexico Department of Transportation (NMDOT)– Aviation Division, City of Albuquerque, Bernalillo County, the Middle Regional Council of Governments (MRCOG), and other pertinent regional planning and economic development agencies.

Sustainable Master Plan Approval Process

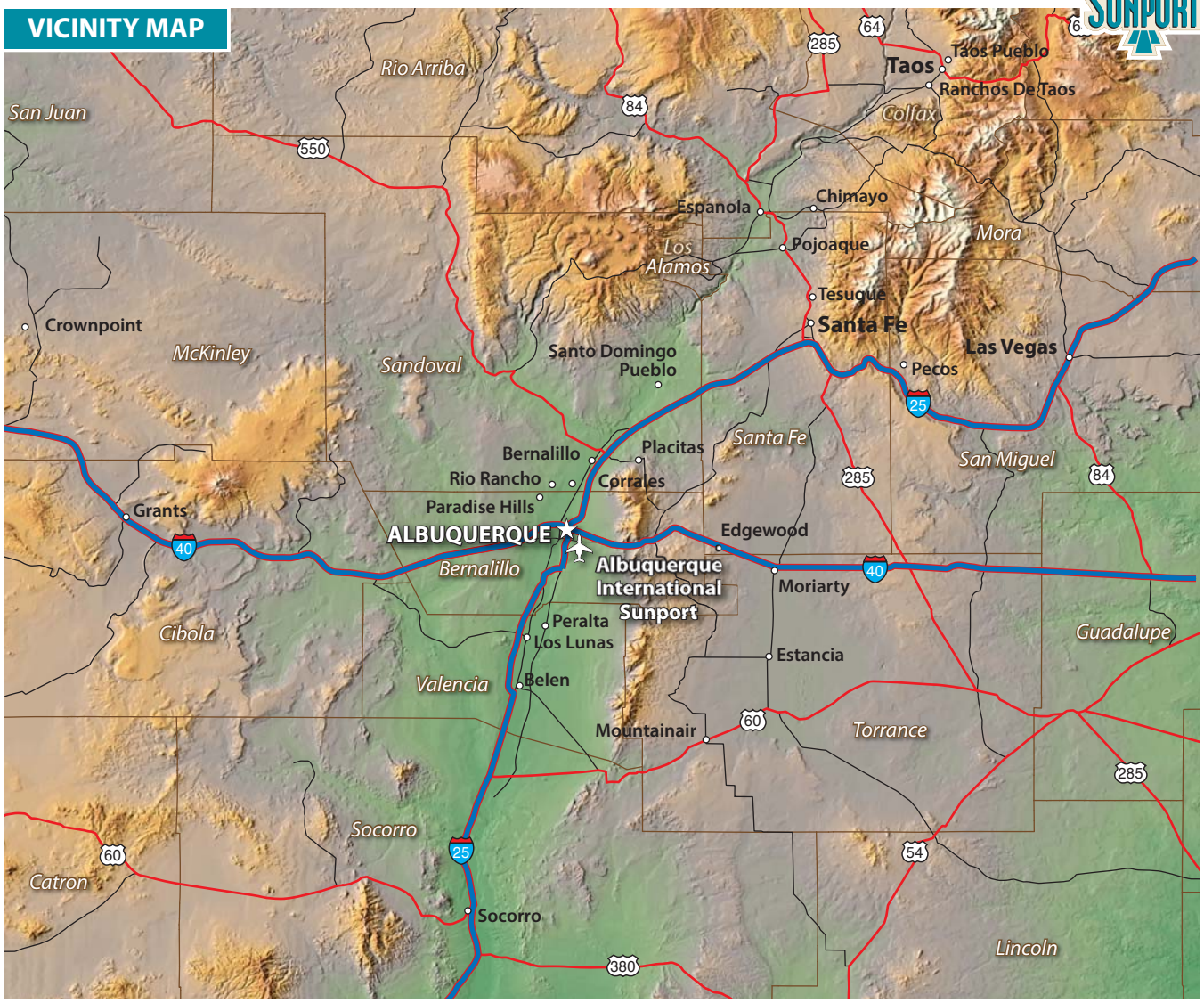
The Albuquerque International Sunport Sustainable Airport Master Plan approval process complies with Federal Aviation Administration (FAA) requirements, which includes City review, approval, and adoption. The Sustainable Master Plan will be reviewed by the City's Environmental Planning Commission (EPC), which will provide a recommendation to the City Council, as the City's Zoning Authority. The Sustainable Master Plan will first go to the Land Use Planning and Zoning Committee (LUPZ), who will then provide its recommendation to the City Council. The City Council will then take action on the Master Plan

Major amendments to the approved Sustainable Airport Master Plan will require a similar process.

REGIONAL SETTING

The City of Albuquerque is located in central New Mexico, along the Rio Grande river. It is situated in the Rio Grande Valley and on the mesas and slopes which rise along either side of the river. The Sandia and Manzano Mountain ranges extend along the eastern edge of the city, with the Tijeras Canyon separating the two ranges. West of the city, the terrain rises gradually to the Continental Divide, approximately 90 miles away. **Exhibit 1A** presents the regional setting for the Sunport.

VICINITY MAP



LOCATION MAP

Exhibit 1A
AIRPORT VICINITY MAP

Albuquerque is the most populous city in New Mexico with a 2013 census estimate of slightly more than 556,000 people. The Albuquerque Metropolitan Statistical Area, which includes the counties of Bernalillo, Sandoval, Torrance, and Valencia, had an estimated population of approximately 957,000 people in 2013. Albuquerque serves as the county seat of Bernalillo County.

AIRPORT LOCATION

The Sunport encompasses approximately 2,743 acres of property.

The Sunport is situated within the southern portion of the City of Albuquerque on a mesa overlooking the Rio Grande. The Sunport is approximately four miles southeast of the central business district (CBD) and encompasses approximately 2,743 acres of property. An additional 145 acres of property is leased from Kirtland Air Force Base (KAFB). The leased property is adjacent to Taxiways A, B, E, and the end of Runway 30.

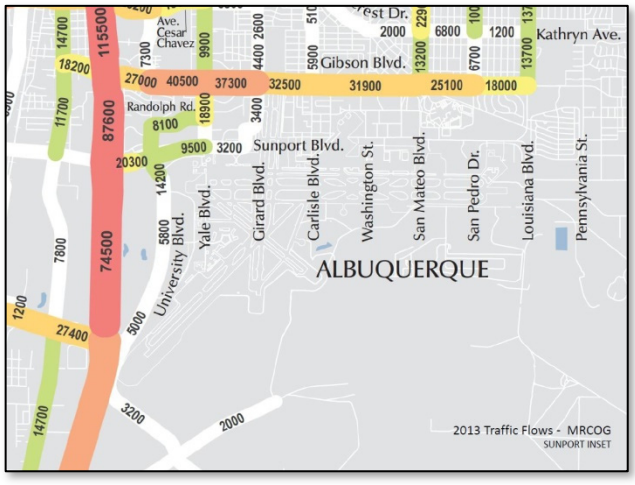
Kirtland AFB shares the runway/taxiway system with the Airport. The primary KAFB facilities are located north of Taxiway B with additional KAFB property surrounding the airport on the north, east, and south sides.

Kirtland AFB shares the runway/taxiway system with the Sunport.

REGIONAL TRANSPORTATION NETWORK

Primary regional access to the City of Albuquerque is provided by U.S. Interstates 40 and 25 (I-40 and I-25). Interstate 25 provides north/south access through the city and I-40 provides east/west access. They intersect immediately northeast of downtown Albuquerque. Interstate 25 passes approximately one mile to the west of the Sunport.

Primary access to the airport is Sunport Blvd., which extends from an interchange with I-25 leading directly to the airport terminal. The airport terminal area can also be accessed via several surface streets, including Yale and Girard Blvd. from the north and University Boulevard from the south.



Traffic Counts

The MRCOG collects traffic counts on all major roads in the area. The resulting traffic data is used to support various transportation planning activities and produce annual Traffic Flow Maps. Traffic counts along the streets approaching the Sunport provide an

indication of the number of vehicles entering the passenger terminal area. **Table 1A** presents the 2013, 2006, and 1999 average weekday traffic counts for roadway segments in the vicinity of the Sunport.

TABLE 1A
Traffic Counts (Sunport Area)

	Average Weekday Traffic Count		
Road Segment	**1999**	**2006**	**2013**
Sunport Blvd. from 1-25 to University	16,900	19,200	20,300
Sunport Blvd. from University to Yale	11,500	14,800	9,500
Sunport Blvd. from Yale to Girard	NA	7,900	3,200
Yale from Gibson to Randolph	19,500	27,800	18,900
Yale from Randolph to Sunport Blvd.	10,200	7,100	NA
Girard South from Gibson Road	2,300	4,900	3,400
University to Access Road B	9,700	18,000	14,200
University from Access Road B to Clark Carr	6,400	6,500	5,800
University from Clark Carr to Spirit	4,500	NA	NA
University from Spirit to I-25	7,600	7,500	5,000

Source: Traffic Flows for the Greater Albuquerque Area, (by year), MRCOG

As mentioned above, the access points leading into and out of the Sunport terminal loop road are from Sunport Boulevard, Yale, and Girard. According to MRCOG, in 2013 there was an average of 9,500 daily vehicles in and out of the Sunport from Sunport Blvd. and 3,400 from Girard. A 2013 count from Yale access was not available, but based upon counts from recent years, it was estimated at approximately 5,000 daily vehicles. This resulted in access or egress by an average of 17,900 vehicles daily. This is lower than in 1999 and 2006, when 24,000 and 26,800, respectively, average daily vehicles (ADT) passed through the terminal area.

CLIMATE

Weather conditions are important to the planning and development of an airport. Temperature is an important factor in determining runway length requirements, while wind direction and speed are used to determine optimum and adequate runway orientation. The need for navigational aids and lighting is determined by the percentage of time that visibility is impaired due to cloud coverage or other conditions.

Albuquerque has an arid high desert climate with mild winters and hot summers. It lies within the northern edges of the Chihuahuan Desert ecoregion. The semi-desert Colorado Plateau located to the west also influences the climate. At 5,312 feet above mean sea level (MSL), the city has one of the highest elevations of any major U.S. city, though the effects of the elevation are tempered by its position

in the southwest continental U.S. Portions of the city in the foothills of the Sandia Mountains rise to over 6,700 feet (MSL). The Rio Grande is classified as an "exotic" river because is flows through a desert ecoregion. The New Mexico portion of the river lies within the Rio Grande Rift Valley, bordered by a system of tectonic faults.

Albuquerque weather is usually sunny and dry, with relatively low humidity. Sunshine averages 278 days a year. Periods of extended cloudiness are rare. Spring usually brings windy and warm conditions. Summers bring average high temperatures in the 90s and occasional monsoon rain fall. The city averages 9.45 inches of precipitation annually. The city experiences approximately 11 inches of snow annually, which typically occurs in January and February.

Table 1B lists historical average climate data for Albuquerque, New Mexico. Information pertaining to temperature and precipitation were obtained from the National Oceanic and Atmospheric Administration (NOAA), while the wind speed, percent of time in instrument and visual flight rule conditions, and clear sky was derived from the Sunport's automated surface observation service (ASOS). Visual flight rule (VFR) conditions are those when the pilot is allowed to fly with visual reference, having a minimum of three miles visibility and at least 1,000-foot cloud ceilings. Instrument flight rule (IFR) conditions are those times where either visibility or cloud heights fall below VFR conditions.

TABLE 1B
Historic Climate Data
Albuquerque, New Mexico

Period	Average Precipitation (in.)[1]	Average Snowfall (in.)[2]	Average Daily High Temp (F)[1]	Average Daily Low Temp (F)[1]	Average Wind Speed (mph)[2]	Percent IFR[2]	Percent VFR[2]	Percent Clear Sky[2]
Jan.	0.38	2.5	46.8	26.1	7.11	2.95%	97.05%	69.00%
Feb.	0.48	2.1	52.5	30.3	8.09	3.69%	96.31%	63.00%
Mar.	0.57	1.8	60.5	35.7	9.14	2.28%	97.72%	66.00%
Apr.	0.61	0.6	69.0	43	10.54	1.03%	98.97%	72.00%
May	0.50	0	78.8	52.5	10.13	0.22%	99.78%	73.00%
Jun.	0.66	0	88.3	61.6	9.55	0.44%	99.56%	76.00%
Jul.	1.50	0	90.1	66.4	8.72	0.57%	99.43%	59.00%
Aug.	1.58	0	87.2	65.1	7.23	0.59%	99.41%	65.00%
Sept.	1.08	0	80.7	57.9	7.76	0.83%	99.17%	71.00%
Oct.	1.02	0.1	69.0	46.1	7.33	0.60%	99.40%	78.00%
Nov.	0.57	1.2	55.8	34.1	6.87	1.39%	98.61%	71.00%
Dec.	0.50	2.7	46.1	26.5	6.84	7.65%	92.35%	61.00%

[1]*Source: NOAA - Climatography of the U.S. No. 81 (30-years of data from 1981-2010) as sourced from the on-airport automated surface observation system (ASOS)*
[2]*Source: On airport ASOS; 110,099 observations from 11.1.2005 to 10.31.2014.*
KEY:
in. - Inches
MPH - Miles per hour
F - Degrees Fahrenheit
IFR - Instrument Flight Rule
VFR - Visual Flight Rule

AIRPORT HISTORY AND BACKGROUND

Albuquerque International Sunport was initially developed in 1937 through a cooperative effort between the City of Albuquerque and the New Mexico Airport Corporation (a subsidiary of Trans World Airlines). The City of Albuquerque took responsibility for developing airfield facilities, while the New Mexico Airport Corporation developed a terminal building, maintenance hangar, and fuel storage facilities on 53 acres owned by the corporation.

Through World War II, the Albuquerque airport served both the airline needs of Trans World Airlines and the growing needs of the Army Air Corps located adjacent to the airport. The City of Albuquerque continued to expand the airfield facilities during the 1940s. By 1945, the airport site had grown to more than 223 acres.

In 1950, the federal government negotiated a quitclaim deed with the city and took possession of the airport. Over the next 12 years, the Department of Defense developed the airport to meet the expanding research and development programs conducted at the Air Base. Meanwhile, the New Mexico Airport Corporation continued operational control over the civilian terminal area.

In 1962, the Department of Defense returned the airfield and most property west of former Runway 17-35 by quitclaim deed to the City. Under the agreement, the Department of Defense retained title to the Air Base while agreeing to provide airport crash, fire and rescue services for civilian operations in accordance with Federal Aviation Regulations. The Department of Defense also agreed to pay the city annual compensation for the use of the airfield.

Initially, all civilian facilities were located northwest of the runways. This included a new passenger terminal (constructed in 1965), apron areas, air mail facility, and aircraft storage hangars. The most significant changes to the facilities occurred in the mid and late 1980s, when all general aviation facilities and the airport maintenance facilities were relocated to the southwest quadrant of the airport. This provided space for the expansion of the passenger terminal building.

Various improvements have continued through the 1990s and into the 2000s. An air cargo facility and apron were constructed in 1992. A replacement airport traffic control tower was constructed in 1994. Runways 8-26 and 3-21 were reconstructed in the mid-1990s, and Runway 3-21 was concurrently upgraded and extended to 10,000 feet in length. Runway 12-30 was reconstructed and extended to 6,000 feet in the late 1990s. A postal facility was also added to the airport in 1994. Taxiway A was reconstructed in 1993, and Taxiway E was constructed in 1991. Four departure gates were added to concourse A in 1996. An observation deck and food court were added in 1998.

Sunport Boulevard was constructed in 1999, providing direct airport access to Interstate 25. It also provided access for rental car facilities to be consolidated remotely from the terminal on the west side of the airport off University Blvd. in 2001. This 76-acre site contains a rental car terminal, rental ready/return areas, and maintenance/storage areas for each rental car provider operating at the Sunport.

In 2003 and 2005, the airport invested in a variety of security enhancements in response to the terrorist attacks of September 11, 2001. This included reconstruction of the airport security checkpoints and remodeling of the original terminal building for use by the Transportation Security Administration (TSA).

The airport has secured several FAA Airport Improvement Program (AIP) grants through the Voluntary Airport Low Emissions Program (VALE). The VALE program is designed to reduce all sources of airport ground emissions and to assist airports in meeting their state regulated air quality responsibilities under the Clean Air Act. In 2009, the airport obtained two electric-hybrid vehicles. In 2010 and 2011, the airport constructed two photovoltaic solar arrays to generate power for use at the airport. The solar arrays are located on top of the parking garage. A 2013 VALE grant funded the purchase of electric vehicle charging stations (eGSE), and the most recent VALE grant in 2014 funded the cost to replace four boilers in the airport's central utility plant.

In the summer of 2012, Runway 17-35 was officially closed. This not only saved the cost of full reconstruction of the runway, but also improved airfield safety and efficiency by eliminating a runway that intersected each of the other three runways on the airfield.

Exhibit 1B presents major capital improvement projects completed over the past several years. The two main funding sources are the AIP (administered by the FAA) and Passenger Facility Charges (PFCs), which is a user fee authorized by the FAA. As can be seen in the exhibit, the Sunport has benefited from nearly $80 million in AIP funding since 2000. PFC funds have supported an additional $170 million in capital projects since the early 1990s. Periodically, the Sunport will receive grants from other sources, such as the Environmental Protection Agency (EPA) and the Department of Energy (DOE), for projects.

HISTORICAL AERONAUTICAL ACTIVITY

At commercial service airports, the number of passenger-boardings (enplanements) is a key indicator of activity levels and are typically the basis for federal grants-in-aid. Enplanements are also a good barometer of operational conditions as they can be used to measure the level of commercial passenger airline services. Another commercial airline indicator is the amount of air cargo shipped, typically recorded in annual enplaned pounds or tons. The airport's based aircraft and annual operations (takeoffs and landings) in aggregate and by aircraft type are also important aeronautical activity measures to factor. These indicators will be used in subsequent analyses in this master plan to project future aeronautical activity and determine future facility needs. Each of the activity segments is briefly described below.

PASSENGER ENPLANEMENTS

Commercial service airports provide local and regional access to the national and international aviation systems. As such, these airports are vital to interstate commerce as well as a key component to local and regional economic infrastructure. These facilities support and drive growth in all socioeconomic categories.

RECENT CAPITAL PROJECTS FUNDED THROUGH FAA AIRPORT IMPROVEMENT PROGRAM (AIP)

Year	AIP Grant #	Project Description	Grant Amount
2014	46	Rehabilitate Taxiway A (Phase 3)	$6,998,810
2014	45	Update Airport Master Plan	$900,000
2014	44	VALE Infrastructure (boiler replacement)	$431,479
2013	43	VALE Infrastructure (eGSE charging stations)	$483,584
2013	42	Rehabilitate Taxiway A (Phase 2-Construction)	$9,077,735
2012	41	VALE Infrastructure (Energy efficiency equipment/infrastructure)	$3,389,237
2012	40	Rehab Taxiway A (Phase 1-Design)/Rehabilitate Taxiway E (Sealcoat)	$659,745
2011	39	Reconstruct GA Apron	$8,275,767
2011	38	VALE Infrastructure (PV solor on parking garage)	$1,765,424
2010	37	VALE Infrastructure (PV solor on parking garage)	$2,441,597
2010	36	Wildlife Hazard Assesment	$81,307
2010	35	Rehabilitate Taxiway Lighting	$2,745,364
2009	34	VALE Infrastructure (2 electric/hybrid vehicles)	$26,130
2008	33	Rehabilitate Apron/Runway Incursion Markings	$9,441,340
2007	32	Rehabilitate Taxiway E	$5,486,917
2006	31	Terminal Apron Rehabilitation	$10,453,996
2005	30	Terminal Apron Rehibilitation	$1,043,078
2005	29	Security Checkpoint Enhancements	$3,872,490
2003	28	Security Enhancements	$8,430,102
2003	27	Rehabilitate Taxiway (A, B, C)	$2,049,933
2002	26	Rehabilitate Runway	$723,933
2002	25	Security Enhancements	$440,000
2000	24	Update Airport Master Plan	$652,069
TOTAL			**$79,870,037**

Source: *FAA Records accessed on 11.10.14. http://www.faa.gov/airports/aip/grantapportion_data/*

RECENT CAPITAL PROJECTS FUNDED THROUGH PASSENGER FACILITY CHARGE (PFC)

Year	PFC#/Project #	Project Description	Grant Amount
2014	3/6	Rehab Terminal-Mech/Elect/Fire	$12,175,304
2013	3/2	Rehabilitate Terminal Apron	$5,352,660
2012	3/5	Rehab Terminal-Public Space	$17,364,987
2011	3/3	Upgrade Communications System	$3,769,000
2007	3/4	Upgrade FIDS/BIDS	$5,883,029
2007	3/7	Const Customs/Fed Insp Station	$402,315
2007	3/8	Rehab Term-Passenger Screening	$1,430,230
2006	3/10	Extend University Boulevard[1]	$0
2006	3/11	PFC Application Admin Fees	$80,000
2005	3/9	Extend Spirit Drive	$3,166,186
2001	2/11	PFC Application Administrative Cost	$67,348
2000	2/6	Runway 12-30 Extension & Reconstr.	$11,814,160
1999	2/7a	DE-II Apron Expansion	$358,979
1999	2/7b	DE-II Taxiway Improvements	$325,157
1999	2/7c	DE-II Runway Improvements	$703,330
1999	2/9	Construct Sunport Boulevard	$10,648,487
1998	2/10	Expand Air Cargo Apron	$1,211,556
1997	1/1	Reconstruction of Runway 8-26	$49,773,870
1996	3/1	Extend Runway 3/21	$28,580,092
1995	2/5	Runway 3-21 Extension & Upgrade	$8,291,816
1995	2/2	Reconstruct Taxiway E	$2,214,261
1994	2/3	Improve Taxiways A & B	$5,285,658
1994	2/4	Terminal Apron Expansion	$331,678
1993	2/1	Update Master Plan	$83,782
1992	2/8	Construct Access Road D	$508,424
TOTAL			**$169,822,309**

[1]Project completed by the City of Albuquerque

Source: *Airport records.*

In 2014, there were 2,446,388 enplanements.

An enplanement includes any revenue passengers that board an aircraft for a fare at an airport. This statistic is important in that it is utilized by the FAA to determine the annual level of entitlement funding dedicated to an airport under the AIP. Airports with at least 10,000 annual enplanements are eligible for a minimum one million dollars in annual entitlement funds. The graph on **Exhibit 1C** depicts historical enplanements at the Sunport since 1970. In 2014, there were 2,446,388 enplanements. Airline passenger activity interrelates with the number of airlines serving the airport, frequency of daily departures, size and type of aircraft used, and the number of non-stop destinations.

At the time of this inventory, the Sunport was served by eight regularly scheduled airlines, offering an average of 38 daily departures (as of January 2015). The airlines providing daily non-stop flights and their destinations were as follows:

- Alaska Airlines (Seattle)
- American Airlines (Chicago, Dallas, Los Angeles, and Phoenix)
- Delta (Atlanta, Salt Lake City, Minneapolis-St. Paul)
- Boutique Air (Silver City, NM)
- Jet Blue (New York City – JFK)
- Southwest (Baltimore-Washington, Chicago-Midway, Dallas Love Field, Denver, Houston - Hobby, Kansas City, Las Vegas, Los Angeles, Oakland, Orlando, Phoenix, Portland, San Diego, Seattle, St. Louis, Tucson)
- United (Chicago, Denver, Houston, Los Angeles, San Francisco)

AIR CARGO

Air cargo activity at the Sunport consists of three categories: air cargo, belly freight, and U.S. mail. In 2015, the following five airlines operated at the airport for air cargo purposes.

- FedEx utilizes a variety of aircraft including Airbus A-300, A-310, and MD-10.
- United Parcel Service (UPS) uses Boeing 757, 767, and A-300.
- Empire Air provides express feeder service for FedEx. Routes to and from the Sunport include Durango, Gallup, and Farmington utilizing the Cessna Caravan 208 aircraft.

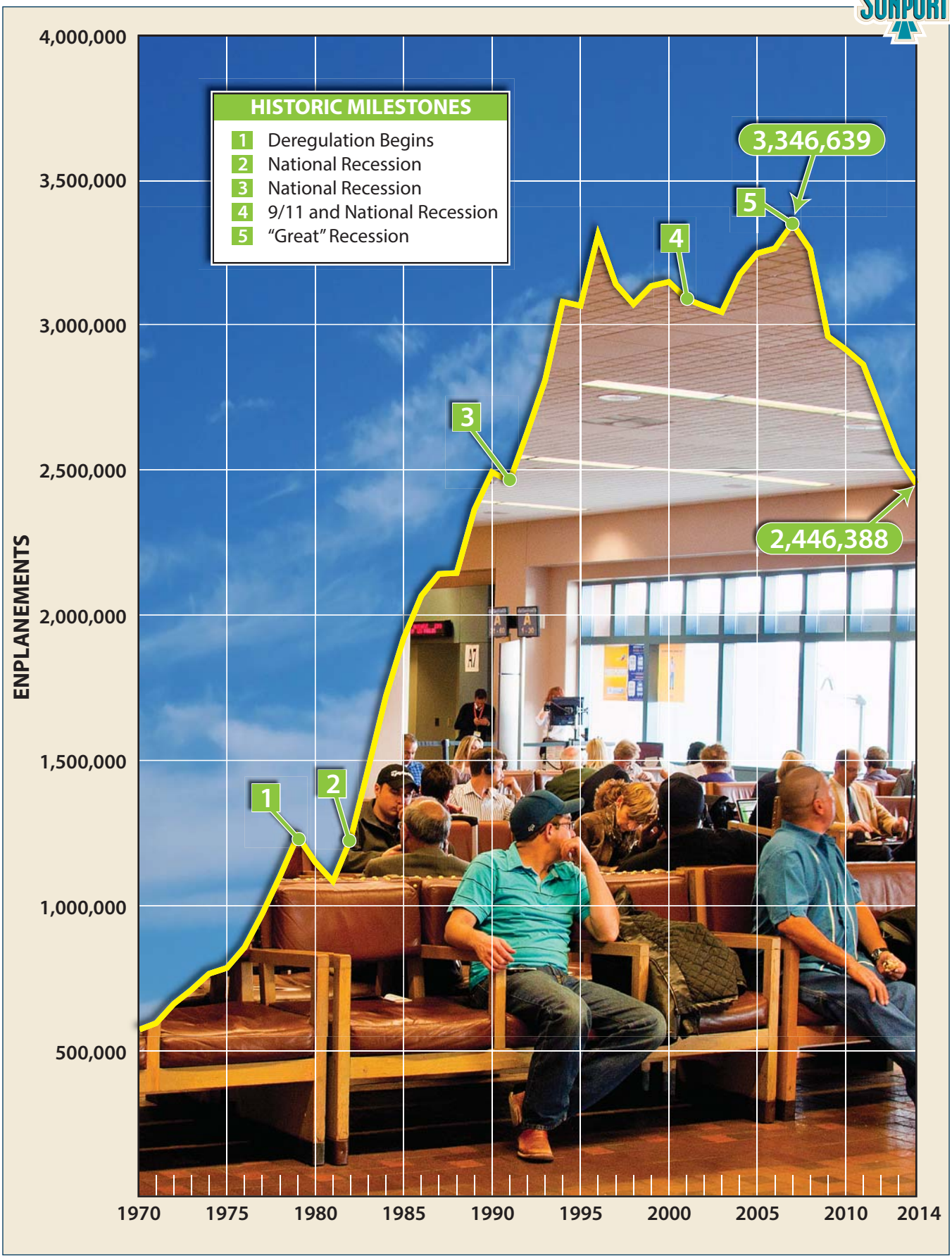


Exhibit 1C
HISTORIC PASSENGER ENPLANEMENTS

- AmeriFlight, Inc. provides express service for FedEx to and from Phoenix. AmeriFlight has a variety of aircraft in its fleet, but primarily utilizes a Piper Chieftain turboprop.

- South Aero, Inc. utilizes both a Cessna 210 Centurion single engine piston and a Cessna 402 light twin piston aircraft for charter cargo express service. South Aero is a feeder airline to UPS.

Table 1C presents the historical air cargo activity at the airport from 2004 through 2014. As can be seen, total air cargo as measured in tons was relatively steady from 2004 through 2007. Since that time, cargo has declined by nearly 29 percent.

TABLE 1C
Historical Air Cargo - Total Freight, Express, Mail
Albuquerque International Sunport

Year	Freight (lbs.)	Express (lbs.)	Mail (lbs.)	Total (lbs.)	Total (tons)
2004	148,019,203	582,957	9,691,960	158,294,120	79,147
2005	156,831,214	544,849	8,966,579	166,342,642	83,171
2006	161,801,374	553,883	5,624,215	167,979,472	83,990
2007	150,881,181	836,052	1,746,584	153,463,817	76,732
2008	133,716,362	500,125	2,028,041	136,244,528	68,122
2009	120,927,312	501,032	1,608,013	123,036,357	61,518
2010	122,478,325	478,325	1,104,484	124,061,134	62,031
2011	120,000,671	489,235	923,977	121,413,883	60,707
2012	128,119,584	480,908	141,992	128,742,484	64,371
2013	112,120,176	479,420	37,042	112,636,638	56,318
2014	111,012,539	342,978	48,949	111,404,466	55,702

Source: Airport records

AIRCRAFT OPERATIONS

Aircraft operations are classified as either local or itinerant. Itinerant operations are arriving or departing aircraft which have an origin or destination away from the airport. Aircraft operations are further subclassified into four general categories: air carrier, air taxi, general aviation, and military. Air carrier operations are defined as those conducted commercially by aircraft having a seating capacity of 60 or more and/or a maximum payload capacity of 18,000 pounds. Air taxi operations can include small commercial service aircraft operations as well as general aviation type aircraft for the "on-demand" commercial transport of persons and property in accordance with 14 Code of Federal Regulations (CFR) Part 135 and Subchapter K of 14 CFR Part 91.

Local operations consist mostly of aircraft training flights conducted in the airport traffic pattern, such as touch-and-go training and practice instrument approaches, or other flights to and from a designated practice area within 20 nautical miles of the airport.

Exhibit 1D presents the annual aircraft operations as counted by the air traffic control tower (ATCT) at the Sunport since 1995. The exhibit includes two categories of itinerant operations: IFR and VFR operations. IFR operations are those conducted during instrument weather conditions or during VFR but under a completed instrument flight plan.

Commercial service operations at the Sunport fall under both air carrier and air taxi categories. Air carrier operations typically include mainline passenger and cargo airlines. Commercial service operations counted as air taxi are represented by regional airlines utilizing small regional jets or turboprop aircraft while hauling under the banner of the mainline carriers. General aviation operations include a wide array of aircraft use ranging from personal to business and corporate uses. Military aircraft also operate extensively at the Sunport, as detailed on **Exhibit 1D**.

BASED AIRCRAFT

Identifying the current number of based aircraft is important to master plan analysis, yet it can be challenging because of the transient nature of aircraft storage. The airport maintains a record of aircraft based on the airport. There are currently 165 aircraft based at the Sunport, which includes 60 single engine piston, 49 multi-engine, 30 business jets, 19 helicopters, and seven classified as "other." Historical based aircraft information is also presented on **Exhibit 1D**.

There are currently 165 aircraft based at the Sunport.

AIRPORT ADMINISTRATION

Albuquerque International Sunport is owned and operated by the City of Albuquerque. Albuquerque has an elected mayor and city council form of government. The Aviation Department is responsible for the management, operation, and development of the Sunport. The Director reports directly to the Mayor and City Council. **Exhibit 1E** presents the airport organizational chart. There is a total of 288 Aviation Department employees.

The Airport Advisory Board acts in an advisory capacity to the Director of Aviation, Mayor, and City Council. The Advisory Board is comprised of nine members who are appointed by the mayor with the advice

and consent of the City Council. Each Advisory Board appointment is for a three-year term, and no board member may serve more than two consecutive terms or until an expired appointment is filled. The Advisory Board typically meets monthly.

AIRPORT SYSTEM PLANNING ROLE

Airport planning exists on many levels: national, state, and local. Each level has a different emphasis and purpose. On the national level, the Albuquerque International Sunport is included in the *National Plan of Integrated Airport Systems* (NPIAS). On the regional and state levels, the airport is included in the *New Mexico Airport Systems Plan*, last updated in 2017. The local planning document is the Airport Master Plan, which was previously updated and approved in 2003.

FEDERAL AIRPORT PLANNING

Many of the nation's existing airports were either initially constructed by the federal government, or their development and maintenance was partially funded through various federal grant-in-aid programs to local communities. The system of airports existing today is due, in large part, to the existence of federal policy that promotes the development of civil aviation. As part of a continuing effort to develop a national airport system to meet the needs of civil aviation and promote air commerce, the United States Congress has continually maintained a national plan for the development and maintenance of airports.

Albuquerque International Sunport is included in the NPIAS as a medium hub, primary commercial service airport.

On the national level, the Albuquerque International Sunport is included in the NPIAS as a medium hub, primary commercial service airport. This designation includes 36 airports nationwide that provide regularly scheduled passenger commercial service and record between 0.25 and 1.0 percent of total U.S. passenger enplanements annually. Overall, the NPIAS identifies 3,330 existing airports which are considered significant to the national air transportation system. The NPIAS is published and used by the FAA in administering the AIP, which is the source of federal funds for airport improvement projects across the country. The program is funded exclusively by user fees and user taxes, such as those on fuel and airline tickets. The 2013-2017 NPIAS estimates that $42.5 billion worth of needed airport improvements are eligible for AIP funding across the country over the next five years. An airport must be included in the NPIAS to be eligible for federal funding assistance through the AIP.

The NPIAS supports the goals identified in the FAA strategic plan, entitled "Destination 2025," for safety, efficiency, access, and environmental sustainability by identifying airport improvements that will help achieve these goals. The current issue of the NPIAS identifies approximately $95.13 million in development needs at Albuquerque International Sunport for the five-year planning horizon. This figure is not a guarantee of federal funding; instead, this figure represents development needs as presented to the

Year	IFR Itinerant Operations					VFR Itinerant Operations					Total Itinerant Operations					Local Operations			Total Operations	Based Aircraft
	AC	AT	GA	MIL	SUB	AC	AT	GA	MIL	SUB	AC	AT	GA	MIL	SUB	GA	MIL	SUB		
1990	65,128	37,695	73,971	27,820	204,614	4,717	2,006	3,176	2,352	12,251	69,845	39,701	77,147	30,172	216,865	2,564	5,497	8,061	224,926	266
1991	55,804	33,201	66,532	24,698	180,235	8,017	2,583	5,359	3,133	19,092	63,821	35,784	71,891	27,831	199,327	3,420	7,483	10,903	210,230	242
1992	54,473	35,296	62,732	19,799	172,300	11,871	3,440	8,009	3,771	27,091	66,344	38,736	70,741	23,570	199,391	2,876	5,928	8,804	208,195	242
1993	65,752	34,690	58,111	18,857	177,410	9,012	4,402	7,608	4,918	25,940	74,764	39,092	65,719	23,775	203,350	3,546	6,540	10,086	213,436	242
1994	70,622	36,994	53,611	18,461	179,688	8,386	3,691	10,069	4,587	26,733	79,008	40,685	63,680	23,048	206,421	4,636	8,066	12,702	219,123	303
1995	73,468	33,481	23,526	12,458	142,933	7,312	4,171	23,902	7,022	42,407	80,780	37,652	47,428	19,480	185,340	4,776	8,416	13,192	198,532	303
1996	81,150	29,704	29,224	9,137	149,215	7,012	2,939	25,187	7,329	42,467	88,162	32,643	54,411	16,466	191,682	5,022	7,543	12,565	204,247	303
1997	79,661	29,528	34,485	11,623	155,297	5,567	3,082	24,807	9,813	43,269	85,228	32,610	59,292	21,436	198,566	7,887	12,278	20,165	218,731	370
1998	77,300	29,142	34,805	12,363	153,610	4,649	3,449	24,387	9,516	42,001	81,949	32,591	59,192	21,879	195,611	12,606	21,001	33,607	229,218	370
1999	81,462	24,959	35,453	13,390	155,264	2,883	3,176	26,617	10,023	42,699	84,345	28,135	62,070	23,413	197,963	10,622	20,348	30,970	228,933	343
2000	78,473	30,493	39,772	13,336	162,074	3,358	3,948	23,412	8,896	39,614	81,831	34,441	63,184	22,232	201,688	11,409	20,076	31,485	233,173	343
2001	78,502	37,201	38,488	13,509	167,700	2,345	3,986	21,149	8,829	36,309	80,847	41,187	59,637	22,338	204,009	14,224	23,440	37,664	241,673	332
2002	79,577	41,361	39,933	15,096	175,967	2,358	7,909	27,714	14,202	52,183	81,935	49,270	67,647	29,298	228,150	8,819	17,599	26,418	254,568	378
2003	74,145	35,542	21,666	8,167	139,520	158	10,965	37,619	13,740	62,482	74,303	46,507	59,285	21,907	202,002	5,372	11,753	17,125	219,127	386
2004	72,479	37,992	14,277	6,426	131,174	1,887	11,868	27,076	14,627	55,458	74,366	49,860	41,353	21,053	186,632	3,343	7,682	11,025	197,657	334
2005	74,904	36,355	14,691	7,386	133,336	5	11,544	24,262	16,297	52,108	74,909	47,899	38,953	23,683	185,444	4,698	6,557	11,255	196,699	341
2006	73,800	32,106	15,462	7,573	128,941	13	11,258	24,215	15,936	51,422	73,813	43,364	39,677	23,509	180,363	4,620	7,258	11,878	192,241	271*
2007	77,102	35,031	16,615	7,225	135,973	82	10,178	24,361	11,731	46,352	77,184	45,209	40,976	18,956	182,325	3,740	4,715	8,455	190,780	265*
2008	75,730	29,350	15,427	6,557	127,064	40	12,769	22,041	11,548	46,398	75,770	42,119	37,468	18,105	173,462	3,261	3,830	7,091	180,553	210*
2009	68,287	25,494	14,036	6,692	114,509	3	8,127	15,828	11,199	35,157	68,290	33,621	29,864	17,891	149,666	3,665	5,198	8,863	158,529	201*
2010	66,095	23,091	10,701	6,011	105,898	0	10,689	17,226	10,867	38,782	66,095	33,780	27,927	16,878	144,680	4,398	7,538	11,936	156,616	175*
2011	65,479	23,994	10,097	4,760	104,330	21	10,305	16,047	10,774	37,147	65,500	34,299	26,144	15,534	141,477	5,420	7,243	12,663	154,140	201
2012	60,665	21,714	10,371	5,135	97,885	5	9,854	16,308	12,012	38,179	60,670	31,568	26,679	17,147	136,064	4,444	7,216	11,660	147,724	175*
2013	55,544	18,944	10,438	4,367	89,293	15	10,534	15,984	11,142	37,675	55,559	29,478	26,422	15,509	126,968	4,650	5,297	9,947	136,915	165*
2014	51,728	18,350	11,784	4,912	86,774	2	9,598	16,764	11,771	38,135	51,780	27,948	28,548	16,683	124,909	2,930	2,230	5,160	130,069	165*

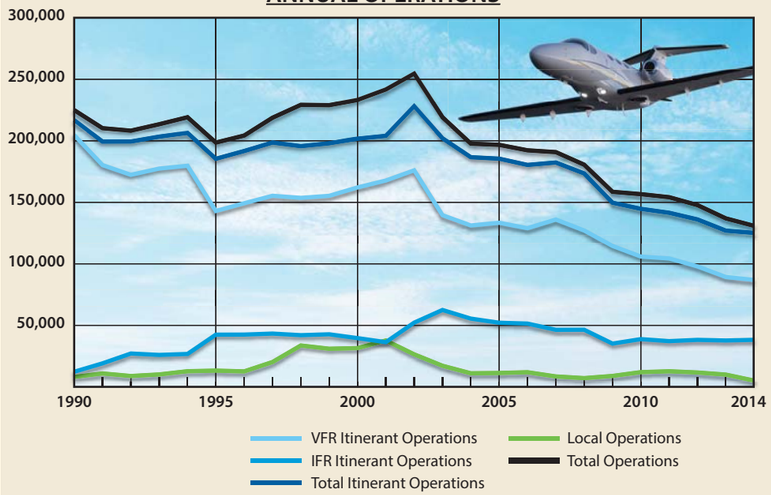
Source: FAA Operational Network (OPSNET)
database access on 2.16.15 at - https://aspm.faa.gov/

Key:

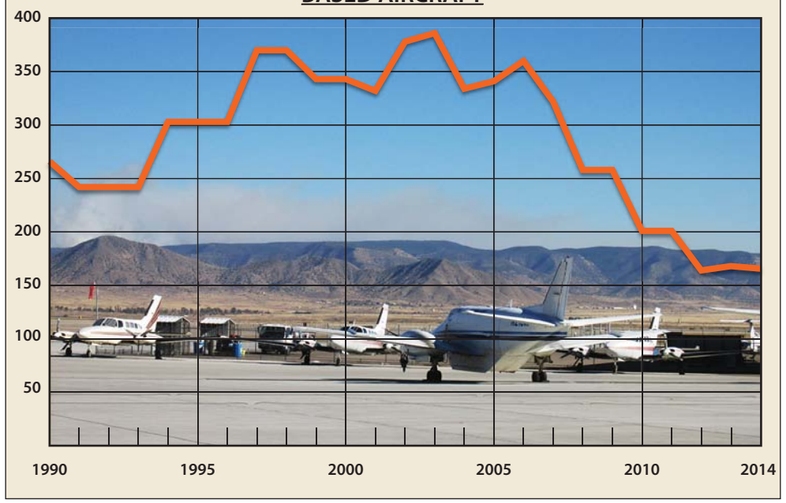
AC - Air Carrier (commercially operated aircraft having seating capacity more than 60 seats or a maximum payload capacity of 18,000 pounds)
AT - Air Taxi (commercially operated aircraft having 60 or fewer passenger seats or less than 18,000 pounds maximum payload capacity)
GA - General aviation
MIL - Military
SUB - Subtotals

* Airport records of based aircraft

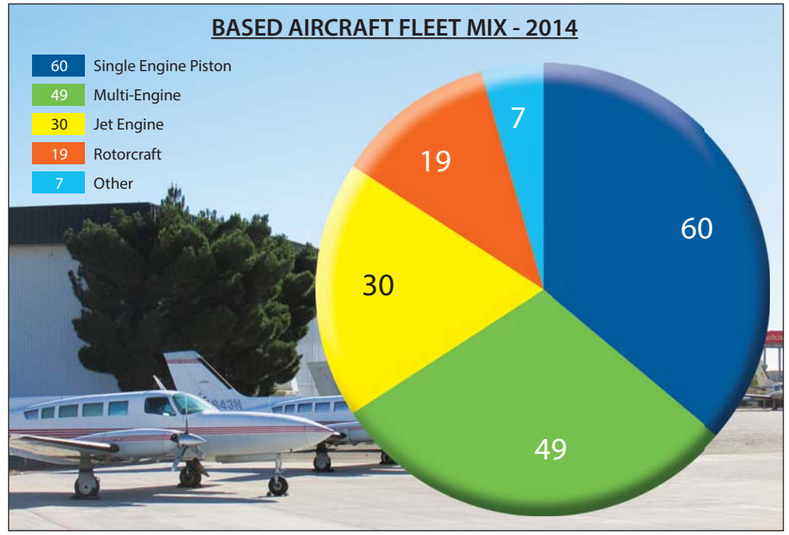
ANNUAL OPERATIONS



BASED AIRCRAFT



BASED AIRCRAFT FLEET MIX - 2014

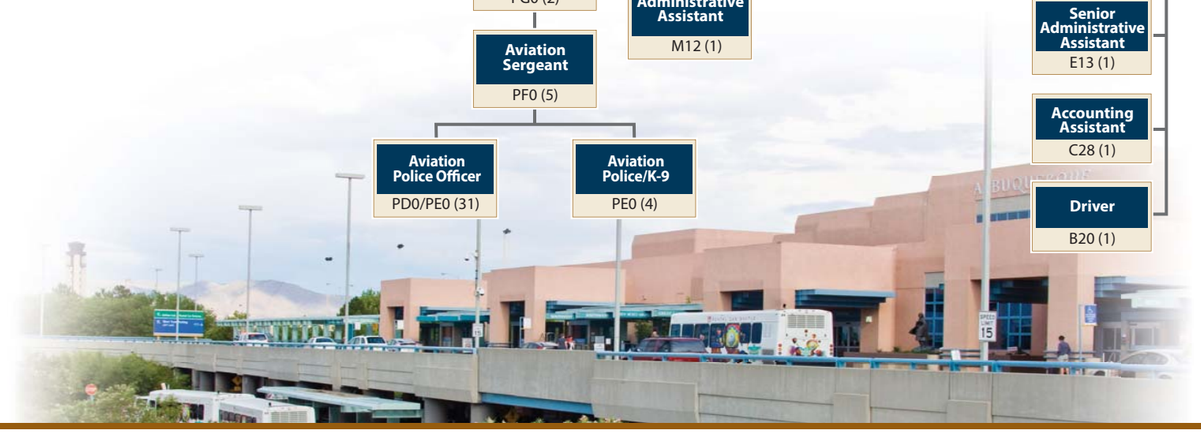


This page intentionally left blank

ALBUQUERQUE INTERNATIONAL SUNPORT
ORGANIZATION CHART PROPOSED 03/30/18

288 Full-time permanent positions*

- **Director** — Unclassified (1)
  - Accounting Assistant — C28 (1)
  - Executive Assistant — E14 (1)
  - Deputy Director — Unclassified (1)
  - Aviation Process Improvement Manager — E19 (1)
  - **Assoc. Dir. Operations and Planning** — E19 (1)
    - Aviation Operations Manager — E18 (1)
      - Airfield Ops. Officer — M15 (5)
      - Airport Access Control Coordinator — E15 (1)
        - Airport Access Control Supervisor — M13 (1)
          - Access Control Assistant — C32 (2)
      - Aviation Planning Manager — E18 (1)
        - Landscape Maint. Coordinator — M15 (1)
      - AF Maint. Manager — E18 (1)
        - AF Maint. Shift Supervisor — M13 (5)
          - Airfield Lead Striper — B35 (2)
          - Electician II — B34 (2)
          - Equipment Operator II — B27 (5)
          - Airfield Maint. Worker — B23 (10)
          - Heavy Equip. Operator — B30 (5)
          - Airfield Striper — B27 (2)
          - Electrician's Helper — B24 (2)
          - Stockkeeper I — B22 (1)
        - AF Fleet Specialist — M14 (1)
          - Lead Mechanic — B35 (1)
            - Mechanic III — B32 (1)
      - DEII Manager — E16 (1)
        - AF Maint. Shift Supervisor — B13 (1)
          - Airfield Maintenance Worker — B23 (1)
      - Aviation Comm. Center Supervisor — E15 (1)
        - Aviation Comm. Training Specialist — M14 (1)
        - AV. Ops. Center Shift Supervisor — M13 (4)
          - Aviation Telecomm. — C33 (11)
    - Tech. Program Manager — I10 (2)
      - Business Technology Specialist II — I8 (1)
      - Business Technology Specialist II — I7 (1)
      - Technical Support Specialist — I7 (1)
      - IT Electronic Specialist — I7 (2)
      - PC Support Specialist I — I5 (1)
    - Sr. Personnel/ Labor Relations Officer — E16 (1)
      - Personnel Officer — E15 (1)
      - HR Analyist I — E14 (1)
      - Accounting Assistant — C28 (1)
    - Aviation Development Manager — Unclassified (1)
      - Marketing Manager — E16 (1)
      - Sunport Marketing Assistant — UCL (1)
      - Aviation Marketing Coordinator — M15 (1)
    - Environmental Program Manager — E18 (1)
    - Assistant City Attorney — Unclassified (1)
      - Contract Manager — E16 (1)
        - Airport Property Specialist — M15 (1)
        - Contract Specialist — M14 (1)
      - Fiscal Manager — E18 (1)
        - Landside Operations Manager — E17 (1)
          - Landside Ops. Shift Supervisor — M13 (5)
            - Laborer — B15 (3)
              - Parking Attendant — B13 (15)
        - Audit Supervisor — E17 (1)
          - Accountant II — M14 (1)
            - Accountant I — M13 (1)
        - Management Analyist II — E16 (1)
          - Avi. Purchasing Coordinator — E16 (1)
            - Facility Office Manager — M14 (1)
              - Buyer — M13 (1)
              - Accountant I — M13 (1)
              - Senior Administrative Assistant — E13 (1)
              - Accounting Assistant — C28 (1)
              - Driver — B20 (1)
    - APD Deputy Chief II/ Commander — PH0 (1)
      - Aviation Lietenant — PG0 (2)
        - Aviation Sergeant — PF0 (5)
          - Aviation Police Officer — PD0/PE0 (31)
          - Aviation Police/K-9 — PE0 (4)
      - Administrative Assistant — M12 (1)
  - **Assoc. Dir. Facilities and Construction** — E19 (1)
    - Custodial Coordinator — E15 (1)
      - Custodial Shift Supervisor — M13 (6)
        - Lead Custodian — B15 (1)
        - Custodians — B13 (60)
          - Warehouse Supervisor — M12 (1)
            - Stockkeeper II — B26 (2)
    - Assist. Airport Facilities Manager — E17 (1)
      - Bldg. Maint. Coordinator — M15 (1)
      - Bldg. Automation System Specialist — M14 (1)
        - Airport Term Fac. Maint. Shift Sup. — M14 (4)
          - Jetway Technician — B34 (5)
            - HVAC Technician — B32 (3)
              - Carpenter — B31 (1)
              - Construction Worker III — B28 (2)
              - Construction Worker II — B26 (4)
            - Plumber — B32 (2)
            - Facilities Equipment Technician — B32 (1)
            - Painter — B28 (2)
            - Plant Operator — B28 (5)
            - Jetway Tech. Helper — B26 (2)
          - Plumbers Helper — B24 (1)
    - Planning Manager — E18 (3)
      - Principal Project Coordinator/AV — E17 (1)



* Total position count subject to change based on the development of the ACE Project and projected growth within the Aviation Department.

Exhibit 1E
AIRPORT ADMINISTRATION ORGANIZATION CHART

This page intentionally left blank

FAA by the airport administration in the annual airport capital improvement program. Of the $42.5 billion in airport development needs identified by the NPIAS nationally, approximately 12 percent, or $5.1 billion, is identified for the 36 medium-hub, commercial service airports, which includes the Sunport.

Airports that apply for and accept AIP grants must adhere to various grant assurances. These assurances include maintaining the airport facility safely and efficiently in accordance with specific conditions. The duration of the assurances depends on the type of airport, the useful life of the facility being developed, and other factors. Typically, the useful life for an airport development project is a minimum of 20 years. Thus, when an airport accepts AIP grants, they are obligated to maintain that facility in accordance with FAA standards for at least that long.

STATE AIRPORT PLANNING

The primary planning document for the State of New Mexico is the *New Mexico Airport Systems Plan* (NMASP). The most recent plan was completed in 2017. The plan provides the NMDOT – Aviation Division with a tool to identify and monitor performance metrics; assess the needs of the state's airports; help justify funding for airport improvements; and provide information to airport sponsors and others concerning the value, use, and needs of the state's public use airports.

The NMASP identified six airport classifications as serving varying roles for the New Mexico airport system and are defined as follows:

Primary Commercial Service: These airports have scheduled major/national or regional/commuter commercial air service, more than 10,000 annual enplanements, and a full range of general aviation activity, including business jets.

Non-Primary Commercial Service: These commercial service airports average between 2,500 and 10,000 annual enplanements and serve general aviation needs.

Limited Commercial Service: These airports average less than 2,500 annual enplanements and include those airports participating in the FAA's Essential Air Service (EAS) program. While these airports in this category have a commercial service element, they also serve high levels of general aviation needs.

Regional General Aviation: These airports primarily serve general aviation activity with a focus on business aviation needs including jet and multi-engine operations. These airports support the system of commercial service airports and are intended to provide significant coverage to the state's population.

Community General Aviation: These airports serve a supplemental contributing role for the local economy in which they are located. Community GA airports focus on providing aviation access for small business, recreation, and personal flying activities.

Low Activity General Aviation: These airports provide a limited economic contribution due to lower activity levels. These airports are considered to provide emergency or remote access and primarily serve recreational and personal flying activities.

Albuquerque International Sunport is classified as a Primary Commercial Service Airport in the NMASP. The minimum facility and service requirements are listed in **Table 1D**. The current airport layout and available services at the Sunport meet and/or exceed the minimum recommendations of the system plan for all criteria.

TABLE 1D
Facility and Service Criteria
NMASP - Primary Commercial Service Airports

Airport Criteria	Minimum Objectives
Airport Reference Code	C-III or greater
Runway Length	75 percent of large aircraft at 90 percent useful load
Runway Width	150’ or 100'
Runway Strength	60,000 lbs. single wheel loading
Taxiway	Full parallel
Instrument Approach	Precision or Near-Precision (LPV)
Visual Aids	Rotating beacon, lighted wind cone/segmented circle, REILs, VGSI, MALSR
Lighting	HIRL, MIRL
Weather Reporting Aids	AWOS, ASOS
Wind Coverage	95% combined coverage
Services	Phones; restrooms; FBO - full service; 24/7 AvGas and Jet A fuel; rental cars; maintenance - full service; public transportation
Facilities	Terminal with public restrooms; conference rooms; pilot lounge; hangar storage for 80% of based aircraft and 25% of transient; auto parking
Safety and Security	Emergency response plan; perimeter fencing

REIL: Runway End Identification Lights
VGSI: Visual Glide Slope Indicator
MALSR: Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
HIRL/MIRL: High/Medium Intensity Runway Lights
AWOS/ASOS: Automated Weather Observation System/Automated Surface Observation System
FBO: Fixed Base Operator
Source: New Mexico Airport System Plan (2017)

14 CFR PART 139 CERTIFICATION

An airport must have an Airport Operating Certificate (AOC) if it is serving air carrier aircraft with more than nine seats or serving unscheduled air carrier aircraft with more than 30 passenger seats. 14 CFR Part 139 describes the requirements for obtaining and maintaining an AOC. This includes meeting various Federal Aviation Regulations (FARs) now codified under the CFR.

Airports are classified in the following categories based on the type of air carrier operations served:

- **Class I Airport** – an airport certificated to serve scheduled operations of large air carrier aircraft that can also serve unscheduled passenger operations of large air carrier aircraft and/or scheduled operations of small air carrier aircraft.

- **Class II Airport** – an airport certificated to serve scheduled operations of small air carrier aircraft and the unscheduled passenger operations of large air carrier aircraft. A Class II airport cannot serve scheduled large air carrier aircraft.

- **Class III Airport** – an airport certificated to serve scheduled operations of small air carrier aircraft. A Class III airport cannot serve scheduled or unscheduled large air carrier aircraft.

- **Class IV Airport** – an airport certificated to serve unscheduled passenger operations of large air carrier aircraft. A Class IV airport cannot serve scheduled air carrier aircraft regulated under CFR Part 121.

The Sunport is currently classified as a Class I CFR Part 139 commercial service airport. This designation supports the regularly (or irregularly) scheduled operations of large and/or small air carrier aircraft conducting commercial passenger services at the airport.

The Sunport is currently classified as a Class I CFR Part 139 commercial service airport.

Part 139 regulations (which implemented provisions of the *Airport and Airway Development Act of 1970*, as amended on November 27, 1971) set standards for: the marking and lighting of areas used for operations; firefighting and rescue equipment and services; the handling and storing of hazardous materials; the identification of obstructions; and safety inspection and reporting procedures. It also required airport operators to have an FAA-approved Airport Certification Manual (ACM).

The ACM is a required document that defines the procedures to be followed in the routine operation of the airport and for response to emergency situations. The ACM is a working document that is updated annually as necessary. It reflects the current condition and operation of the airport and establishes the responsibility, authority, and procedures as required. There are required sections for the ACM covering administrative detail and procedural detail. Albuquerque International Sunport has a current, approved ACM. The ACM includes the following information:

- General Information
- Organization and Management
- Airport Information
- Maintenance and Inspection Program
- Operational Safety
- Hazardous Materials
- Aircraft Rescue and Firefighting
- Snow and Ice Control
- Airport Emergency Plan
- Wildlife Hazard Management
- Maintenance of Certification Manual

AIRFIELD FACILITIES

Airfield facilities are those that facilitate aircraft movements between the air and ground. Generally, these facilities include runways, taxiways, airport lighting and markings, and navigational aids. **Exhibit 1F** summarizes and depicts airfield facility information atop an aerial photograph for visual reference.

RUNWAYS

Albuquerque International Sunport has three runways. Runway 8-26 is the airport's primary runway. Runway 3-21 is the crosswind runway, and Runway 12-30 is the other crosswind runway primarily serving general aviation operations. Runways 8-26 and 3-21 are capable and certified to accommodate air carrier aircraft operations.

Primary Runway 8-26

Runway 8-26 is 13,793 feet long by 150 feet wide and oriented east-west. The concrete pavement has a grooved surface treatment and is reported as being in good condition by official FAA publications. Runway 8-26 has precision markings providing threshold bars, runway end designations, touchdown zone, aiming point, centerline, and edge markings. As the airport's longest runway and served by a precision instrument landing system (ILS), Runway 8-26 is the primary runway. The landing threshold on Runway 8 is displaced 1,000 feet.

Runway 8-26 has a pavement strength of 100,000 pounds single wheel loading (S), which refers to the design of certain aircraft landing gear that has a single wheel on each main landing gear strut. The runway pavement has also been strength-rated at 210,000 pounds dual wheel (D), 360,000 pounds for dual tandem wheel (DT), and 720,000 pounds for double dual tandem wheel (DDT).

Commercial Crosswind Runway 3-21

Oriented northeast-southwest, crosswind Runway 3-21 is 10,000 feet long and 150 feet wide. The concrete runway has a grooved surface treatment, precision runway markings, and is reported in FAA publications to be in good condition. The published pavement strength is 100,000 pounds S, 210,000 pounds D, 360,000 pounds DT, and 720,000 pounds DDT. Runway 3-21 intersects Runway 12-30 approximately 2,000 feet from the Runway 21 threshold.

TAXIWAYS

Designation	Service	Safety Area Width
Taxiway A (Inc. A1-A12)	Air Carrier/GA	214'
Taxiway B (Inc. B4-B6)	Air Carrier/GA	214'
Taxiway C[1] (Inc. C4-C5)	Air Carrier/GA	214'
Taxiway D[2] (South of Twy B)	Air Carrier/GA	214'
Taxiway E (Inc. E1-E12)[3]	Air Carrier/GA	214'
Taxiway F (Inc. F1-F6)	Air Carrier/GA	214'
Taxiway G (Inc. G1-G3)	GA	118'
Taxiway H	Military	NA
Taxiway J	Air Carrier/GA	214'
Taxiway K	GA	118'
Taxiway M (Inc. M1-M8)	Military	NA

[1]Twy C north of terminal apron closed (Inc. C1-C3)
[2]Twy D north of Twy B closed (Inc. D1-D3)
[3]Twy E5 closed

INSTRUMENT AND VISUAL APPROACH AIDS

	Runway 8	Runway 26	Runway 3	Runway 21	Runway 12	Runway 30
Instrument Landing System (ILS) Glide Slope and Localizer	Yes	No	Yes	No	No	
Global Positioning System (GPS)	Yes	Yes	Yes	Yes	No	
RNAV (RNP)	Yes	Yes	Yes	Yes	No	
RNAV (GPS)	Yes	No	Yes	No	No	
VOR or TACAN	Yes	No	No	No	No	No
Approach Lighting System (ALS)	MALSR	None	MALSR	None	None	None
Runway Visual Range Equipment (RVR)	Touchdown	None	Touchdown	None	None	None
Visual Glide Slope Indicator (VGSI)	VASI-6L	PAPI-4L	PAPI-4L	PAPI-4L	None	PAPI-4L
Visual Glide Angle	2.95°	3.00°	3.00°	3.00°	No	3.00°
Runway End Identifier Lights (REIL)	No	Yes	Yes	Yes	No	Yes

KEY

TACAN - Tactical Air Navigation
RNAV - Area Navigation (GPS variant)
RNP - Required Navigation Performance (GPS variant)
MALSR - Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
REIL - Runway End Identifier Lights
VOR - VHF Omnidirectional Radio Range
PAPI - Precision Approach Path Indicator
VASI - Visual Approach Slope Indicator

Source: Airport/Facility Directory - Southwest U.S. (Effective Nov. 13, 2014); Airport records.

LEGEND

- Airport Property Line
- Lease Line
- HS — Runway Hot Spot (HS)

NORTH

0 1,600
SCALE IN FEET

Aerial Source: Google Earth 3/9/2014

WEATHER AND NAVIGATIONAL AIDS

Airport Beacon
Lighted Wind Cones (5)
Automated Surface Observation System (ASOS) - 505-242-4044
Airport Traffic Control Tower (ATCT) - 120.3 Mhz (24hr.)
Automated Terminal Information System (ATIS) - 118.0 Mhz
Universal Communication Frequency (UNICOM) - 122.95 Mhz

RUNWAYS

Field Elevation: 5,355' Above Sea Level	Runway 8	Runway 26	Runway 3	Runway 21	Runway 12	Runway 30
Runway Length (feet)	13,793		10,000		6,000	
Runway Width (feet)	150		150		150	
Threshold Displacement (feet)	1,000	NA	NA		NA	
Blast Pad Dimensions (feet)	500 x 220	1,000 x 220	400 x 220	Twy Leadin	Twy Leadin	None
Pavement Type	Concrete		Concrete		Concrete	
Pavement Treatment	Grooved (130' wide)		Grooved (130' wide)		Grooved (130' wide)	
Pavement Condition (FAA Reported)	Good		Good		Good	
Gradient	0.20%		0.20%		0.10%	
Runway Load Bearing Strength (lbs.)						
Single Wheel (S)	100,000		100,000		65,000	
Duel Wheel (D)	210,000		210,000		120,000	
Double Dual Wheel in Tandem (DT)	360,000		360,000		NA	
Double Dual Wheel in Double Tandem (DDT)	720,000		720,000		NA	
Runway Pavement Markings	Precision		Precision		Basic	
Lighting						
Edge Lights	High Intensity		High Intensity		Medium Intensity	
Centerline Lights	Yes		Yes		No	
Touchdown Zone Lights	Yes	No	Yes	No	No	
Usable for Air Carrier Operations	Yes		Yes		No	
Traffic Pattern	Right	Left	Right	Left	Right	Left

This page intentionally left blank

General Aviation Crosswind Runway 12-30

Runway 8-26 is 13,793 feet long by 150 feet wide; Runway 3-21 is 10,000 feet long and 150 feet wide; and Runway 12-30 is 6,000 feet long and 150 feet wide.

Oriented northwest-southeast, crosswind Runway 12-30 is 6,000 feet long and 150 feet wide. The runway is also concrete with a grooved surface treatment and is reported in FAA publications to be in good condition. Runway 18-36 has non-precision markings, which include threshold bars, runway end designations, touchdown zone, and centerline markings. The published pavement strength is 65,000 pounds S and 120,000 pounds D. Runway 12-30 intersects Runway 3-21 approximately 2,600 feet from the Runway 30 threshold.

TAXIWAYS

The taxiway system at the Sunport consists of parallel, connector, and entrance/exit taxiways. The width of each taxiway varies based on aircraft design and usage, with each listed in **Exhibit 1F**. The taxiway safety area extending from the centerline of each taxiway meets the design standard for the design aircraft type using the taxiway.

Parallel taxiways are primarily designed to efficiently and quickly route aircraft between the runway and the originating/destination location. Taxiway A extends the full length of primary Runway 8-26. In front of the commercial terminal, the Taxiway A centerline is separated from the runway centerline by 450 feet. Farther to the east, the separation is 550 feet, and the eastern portion is 600 feet from the runway centerline.

Taxiway B also runs parallel to Runway 8-26 and Taxiway A for a distance of approximately 4,200 feet west from the commercial terminal apron. Taxiway B provides for dual circulation in this area.

Taxiway E is parallel to and south of Runway 8-26. The western portion is 680 feet from the runway centerline, the central portion is at 600 feet separation, and the eastern portion is 550 feet from the runway

Taxiway F is a partial parallel taxiway to Runway 3-21. Its centerline is separated from the runway centerline by 450 feet. Taxiway G is parallel to Runway 12-30 and its centerline is separated from the runway centerline by 350 feet on the northwestern end and 300 feet on the southeastern end.

A variety of connector and entrance/exit taxiways connect the parallel taxiways with the runway system. All taxiways with the “M” designator are available for the exclusive use of the military, as is Taxiway H.

PAVEMENT MARKINGS

All three runways have pavement marking in accordance with FAA regulations. A Modification of Standards (MOS) for runway hold lines on taxiways leading to/from both Runways 8-26 and 3-21 was granted on September 8, 2004. The MOS permits these hold lines to remain at a separation distance of 250 feet from the runways and does not require that they be further separated due to the elevation of the airport. The MOS is to remain in effect for the life of the runways or until rescinded by the FAA.
Taxiway and taxilane centerline markings are provided to assist pilots in maintaining proper clearance from pavement edges and objects near the taxiway/taxilane edges. Enhanced taxiway centerline markings begin 150 feet out from all runway holding position markings. Each runway holding position marking is accompanied with appropriate surface painted holding position signs indicating the approaching runway intersection.

Aircraft movement areas on various ramps are identified with centerline markings. Aircraft tie-down positions are identified on various ramp surfaces.

PAVEMENT HISTORY AND CONDITION

Appendix B presents the condition and rehabilitation history of the major pavements at the Sunport. The FAA generally classifies pavement condition as excellent, good, fair, or poor. Excellent and good conditioned pavements are fully suitable for use provided that routine maintenance is performed. Fair condition pavement may need short-term maintenance, and poor condition pavements are generally in need of full rehabilitation in the short-term.

Primary Runway 8-26 is considered to be in good condition and was last reconstructed in 1995. Major pavement sections were replaced in 1999, 2012, and 2015. Commercial crosswind Runway 3-21 is also in good condition. It was last reconstructed when it was lengthened, widened, and strengthened in 1994. Runway 12-30 is in good condition, having been reconstructed when it was lengthened in 1999.

Through the years, the Sunport has maintained an ongoing pavement rehabilitation and maintenance program. Most of the taxiways are in good to excellent condition. Portions of Taxiways B, C, C-5, D, E, E-1, E-6, E-7, E-8, E-9, E-10, E-11, and E-12 are in fair to poor condition.

Several taxiways have been closed over the years due to redundancy or for safety design reasons. Of particular note was the closure of Taxiway E-5 in 2014. This was closed in order to keep taxiing aircraft from encroaching on the Runway 21 protection zone (RPZ). Taxiways C-1, C-2, C-3, C-4, D-1, D-2, and D-3 were closed in association with the closure of Runway 17-35 in 2012.

Note: As part of this Sustainable Master Plan project, all airfield pavements will be analyzed in accordance with FAA AC 150/5320-6e, *Airport Pavement Design and Evaluation* and ASTM D5340, *Standard Test Method for Airport Pavement Condition Index Surveys*. The result of this effort will be a Pavement Condition Index (PCI) report, a summary of which will be included as an appendix to this Master Plan.

AIRFIELD SAFETY

The FAA Runway Safety Action Plan (RASP) is a program of inspections at airports with the intent of identifying any potential safety related issues on the airfield. The goal of the RASP is to improve airfield safety and to reduce/eliminate runway incursions.

Hot Spots

The FAA defines an "airport surface hot spot" as a location on an airport movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots/drivers is necessary. A hot spot is a runway safety related problem area on an airport that presents increased risk during surface operations. Typically, it is a complex or confusing taxiway/taxiway or taxiway/runway intersection. The area of increased risk has either a history of or potential for runway incursions or surface incidents, due to a variety of causes, such as but not limited to airport layout, traffic flow, airport marking, signage and lighting, situational awareness, and training. Hot spots are depicted on airport diagrams as open circles or polygons designated as "HS1," "HS2," etc.

There are four hot spots identified at the Sunport. They are depicted on **Exhibit 1F** and described as follows:

1. HS1: The hold position marking on Taxiway E1 is the hold short position for both Runways 8 and 12. When instructed by the tower to move beyond this point, pilots must ensure the proper alignment on the correct runway.
2. HS2: Taxiways G and G1 are adjacent to the general aviation apron. Pilots must be alert not to inadvertently enter Runway 12-30 without tower authorization.
3. HS3: This area has the convergence of three taxiways and a runway. Pilots must be alert for the hold short line for Runway 3-21.
4. HS4: Taxiway E5 is permanently closed. Hold short lines for Runway 3-21 on Taxiways E, H, and Hot Pad 2. The concern is the potential for pilots travelling on Taxiway E to confuse Taxiway H and Runway 3-21.

AIRFIELD LIGHTING

Airfield lighting systems extend an airport's usefulness into periods of darkness and/or poor visibility. A variety of lighting systems are installed at the airport for this purpose. These lighting systems, categorized by function, are summarized as follows.

Identification Lighting: The location of the airport at night is universally identified by a rotating beacon. The rotating beacon projects two beams of light, one white and one green, 180 degrees apart. The rotating beacon at Albuquerque International Sunport is situated on top of a 55-foot tall pole in the center of the general aviation vehicle parking complex in the southwest area of the Sunport.

Airport Beacon

Runway and Taxiway Lighting/Signage: Runway and taxiway edge lighting utilize light fixtures placed near the edge of the pavement to define the lateral limits of the pavement. This lighting is essential for safe operations during night and/or times of low visibility in order to maintain safe and efficient access to and from the runways and aircraft parking areas.

Runways 8-26 and 3-21 are equipped with high intensity runway lights (HIRL) to include runway edge and centerline lighting. The touchdown zones for Runways 8 and 3 are equipped with high intensity touchdown zone lighting. Runway 12-30 is served by medium intensity runway lights (MIRL). All runway edge light lenses are split white-yellow to mark the caution zone on the last 2,000 feet of each runway end. All taxiways are equipped with medium intensity taxiway edge lighting (MITL) except for that portion of Taxiway A between Taxiway A1 and A4, which is high intensity (HITL).

The airport also has a runway/taxiway signage system. The presence of runway/taxiway signage is an essential component of a surface movement guidance control system necessary for the safe and efficient operation of the airport. The signage system installed at Albuquerque International Sunport includes runway and taxiway designations, holding positions, instrument landing system (ILS) critical areas, routing/directional, runway end and exits, and runway distance remaining. All airfield signs are lit with LED lights. **Exhibit 1G** depicts the existing airfield signage system for the Sunport on an aerial base map.

At the Runway 12 threshold, there are special warning lights similar to elevated runway guard lights. These lights are intended to further alert pilots that they are approaching a runway end in this area.

Visual Glide Slope Approach Aids: Visual glide slope approach aids provide a visual cue to pilots alerting them to whether they are on the correct glide path to landing. The approach to Runway 8 is outfitted with a visual approach slope indicator lighting system (VASI). The approach path angle is set at 2.95°. Runway ends 26, 3, 21, and 30 are each outfitted with precision approach path indicator lights (PAPI) with 3.00° a glide path. While configured differently than the VASI system, the PAPI provides the same visual cue to pilots. The VASI and PAPIs at the Sunport are owned and maintained by the FAA. All other lighting systems are owned by the Sunport.

Kirtland Air Force Base

George Rd.

Runway 8-26

Runway 12-30

University Blvd.

Access Road B

Access Road C

Runway 3-21

Spirit Dr.

LEGEND

- Airport Property Line
- Lease Line
- Airfield Guidance Sign
- Boundary Sign
- 17-35 Mandatory Instruction Sign
- C2 Location Sign
- C2 Direction Sign
- 3 Runway Distance Remaining Sign

NORTH

0 1,200

SCALE IN FEET

Aerial Source:
Google Earth 3/9/2014

Exhibit 1G
AIRFIELD SIGNAGE PLAN

This page intentionally left blank

Approach Light Systems (ALS): Runways 8 and 3 are equipped with a medium intensity approach light system (MALS) which offers a lighted, visual grid for pilots to identify the runway end while on final approach. The MALS is supplemented with runway alignment indicator lights (RAIL). The combined MALS and RAIL is referred to as a MALSR. The RAIL portion of the MALSR is a linear progression of strobe lights which provides pilots with a rapid, visual cue of the runway centerline.

The MALS serving Runway 8 is embedded in the pavement leading to the displaced landing threshold. The RAIL portion extends an additional 1,400 feet to the west of the runway pavement end. The MALSR system serving Runway 3 is situated on fixtures leading to the landing threshold. No other runway ends have approach lighting systems.

Runway end identifier lights (REILs) are strobe lights placed at the edge of the landing thresholds of certain runways. REILs provide rapid identification of the landing threshold for a distance of up to 20 miles. The approaches to Runways 26, 3, 21, and 30 are equipped with REILs.

After-Hours Lighting: Airfield lighting is controlled by the ATCT. The airfield lights are typically off during the day, weather permitting, and on at night.

Emergency Generators: Airfield lighting is powered through two electrical vaults. Generally, the "north vault" powers Runway 8-26, its parallel taxiways, and the circuits on the north side of the airfield. The "south vault" powers Runway 3-21, Runway 2-30, and the circuits on the south side of the airfield. There is an independent commercial feed to each vault, and the vaults are interconnected. If either commercial feed fails, the remaining feed will provide power to both vaults. If both commercial feeds fail, emergency generators, one located in each vault, will provide emergency power to the runways and taxiways.

WEATHER AND COMMUNICATION AIDS

Runway visual range (RVR) is the distance over which a pilot of an aircraft on the centerline of the runway can see the runway surface markings delineating the runway or identifying its centerline line. RVR is expressed in feet and is used as one of the main criteria for minima on instrument approaches. The maximum RVR reading is 6,000 feet, above which the reading becomes insignificant and does not need to be reported. RVR sensor equipment has been installed near the touchdown zone for Runways 8 and 3. The RVR equipment measures visibility, background luminance, and runway light intensity to determine the distance a pilot should be able to see down the runway. The RVR data is interfaced with the on-airport Automated Surface Observing System (ASOS), as well as other FAA databases.

Albuquerque International Sunport is equipped with five lighted wind cones. The wind cones provide information to pilots regarding wind conditions, such as direction and intensity, and are rated for 30-knot winds. The windsocks are located in proximity to the approach end of Runways 8, 26, 3, 21 and 30.

Albuquerque International Sunport is served by an ASOS. An ASOS automatically records weather conditions such as temperature, dew point, wind speed, altimeter setting, visibility, sky condition, and precipitation. The ASOS updates observations each minute, 24 hours a day, and this information is transmitted to pilots in the airport vicinity via an FAA very high frequency (VHF) ground-to-air radio transmitter. Pilots can receive these broadcasts on the automated terminal information service (ATIS) frequency or via a dedicated ASOS local telephone number (505-242-4044), where a computer-generated voice will present airport weather information. ATIS broadcasts are updated hourly and provide arriving and departing pilots the current surface weather conditions, communication frequencies, and other important airport-specific information. The ATIS frequency at Albuquerque International Sunport is 118.0 MHz.

The Albuquerque International Sunport Universal Communication Frequency (UNICOM) is available for pilots to receive information pertaining to the airport. The frequency is 122.95 MHz.

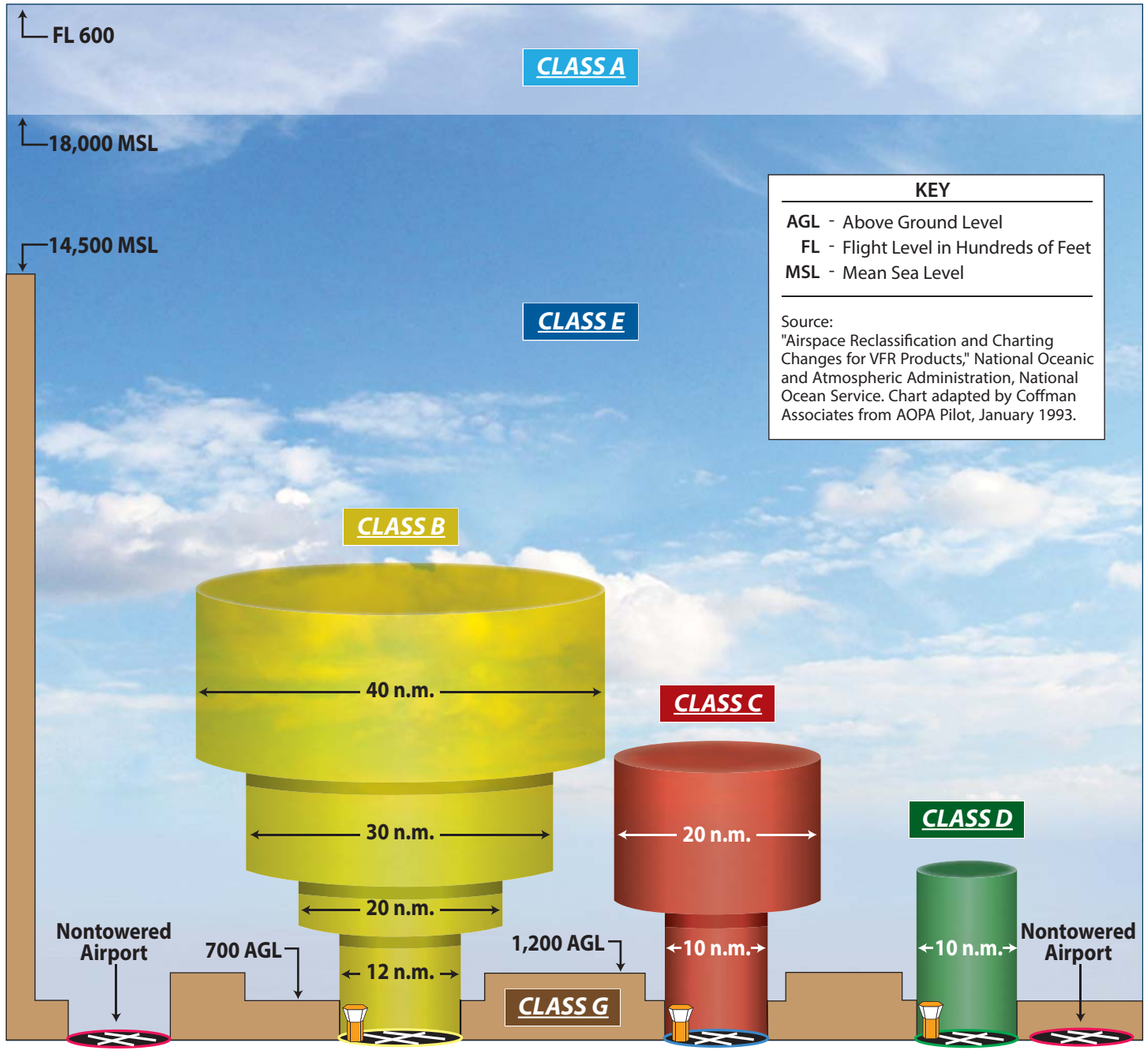
AREA AIRSPACE AND AIR TRAFFIC CONTROL

The *Federal Aviation Administration Act of 1958* established the FAA as the responsible agency for the control and use of navigable airspace within the United States. The FAA has established the National Airspace System (NAS) to protect persons and property on the ground and to establish a safe and efficient airspace environment for civil, commercial, and military aviation. The NAS covers the common network of U.S. airspace, including air navigation facilities; airports and landing areas; aeronautical charts; associated rules, regulations, and procedures; technical information; and personnel and material. The system also includes components shared jointly with the military.

AIRSPACE STRUCTURE

Airspace within the United States is broadly classified as either “controlled” or “uncontrolled.” The difference relates primarily to requirements for pilot qualifications, ground-to-air communications, navigation and air traffic services, and weather conditions. Six classes of airspace have been designated in the United States, as shown on **Exhibit 1H**. Airspace designated as Class A, B, C, D, or E is considered controlled airspace. Aircraft operating within controlled airspace are subject to varying requirements for positive air traffic control.

Class A Airspace: Class A airspace includes all airspace from 18,000 feet mean sea level (MSL) to flight level (FL) 600 (60,000 feet MSL). This airspace is designated in FAR Part 71.193, for positive control of aircraft. The Positive Control Area (PCA) allows flights governed only under IFR operations. The aircraft must have special radio and navigation equipment, and the pilot must obtain clearance from an ATC facility to enter Class A airspace. In addition, the pilot must possess an instrument rating.



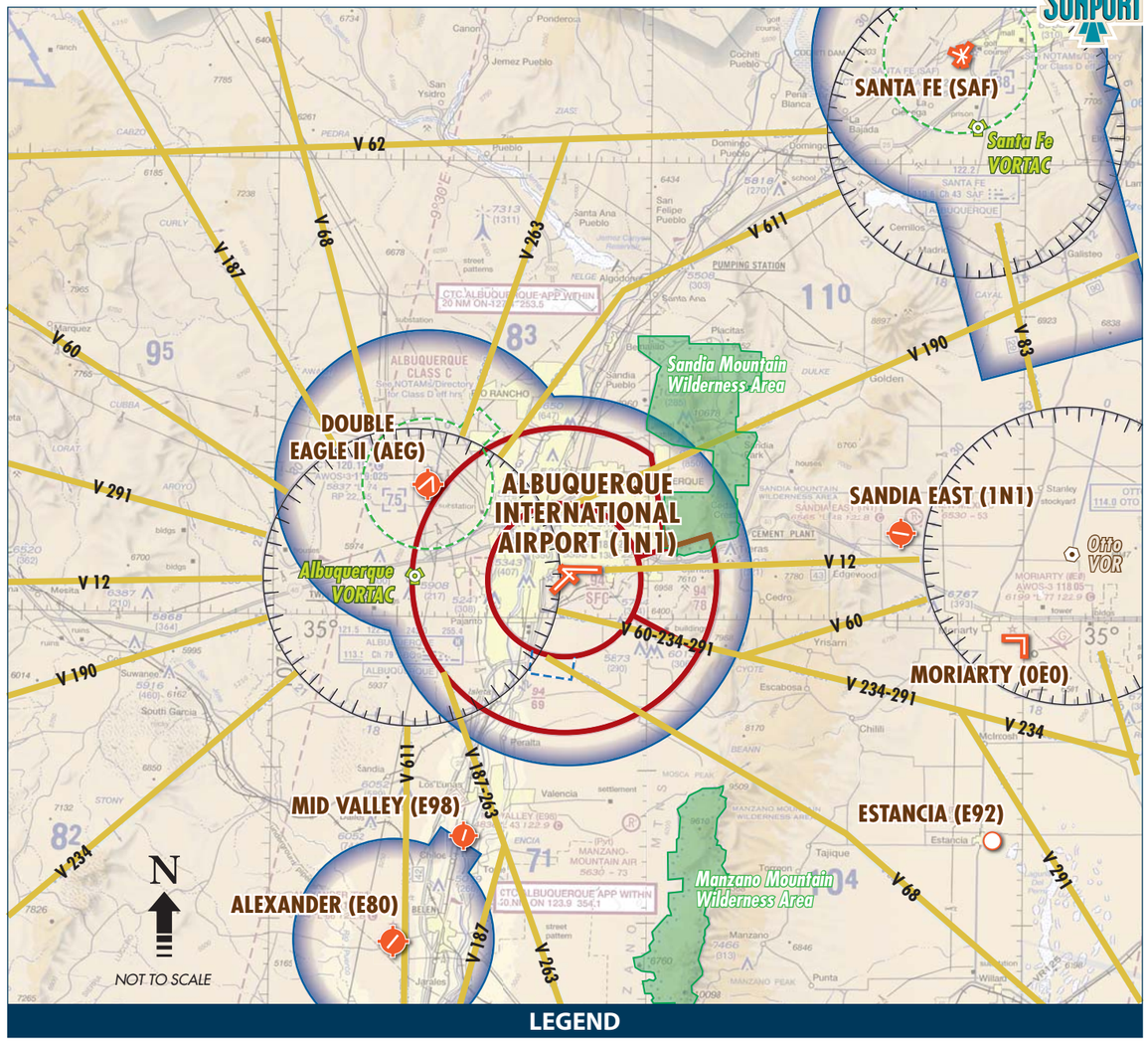
KEY

AGL	- Above Ground Level
FL	- Flight Level in Hundreds of Feet
MSL	- Mean Sea Level

Source:
"Airspace Reclassification and Charting Changes for VFR Products," National Oceanic and Atmospheric Administration, National Ocean Service. Chart adapted by Coffman Associates from AOPA Pilot, January 1993.

DEFINITION OF AIRSPACE CLASSIFICATIONS

CLASS A	Generally airspace above 18,000 feet MSL up to and including FL 600.
CLASS B	Generally multi-layered airspace from the surface up to 10,000 feet MSL surrounding the nation's busiest airports.
CLASS C	Generally airspace from the surface to 4,000 feet AGL surrounding towered airports with service by radar approach control.
CLASS D	Generally airspace from the surface to 2,500 feet AGL surrounding towered airports.
CLASS E	Generally controlled airspace that is not Class A, Class B, Class C, or Class D.
CLASS G	Generally uncontrolled airspace that is not Class A, Class B, Class C, Class D, or Class E.



LEGEND

- Airport with other than hard-surfaced runways
- Airport with hard-surfaced runways 1,500' to 8,069' in length
- Airports with hard-surfaced runways greater than 8,069' or some multiple runways less than 8,069'
- VORTAC
- VOR
- Compass Rose
- Prohibited, Restricted, Warning and Alert Areas
- Wilderness Areas
- Victor Airways
- Class C Airspace
- Class D Airspace
- Class E Airspace
- Class E (sfc) Airspace with floor 1200 ft. or greater above surface that abuts Class G Airspace
- Class E Airspace with floor 700' above surface

Source: Albuquerque Sectional Chart, US Department of Commerce, National Oceanic and Atmospheric Administration, October 16, 2014

This page intentionally left blank

Class B Airspace: Class B airspace has been designated around some of the country's busiest commercial service airports, such as the Phoenix Sky Harbor Airport. Class B airspace is designed to regulate the flow of uncontrolled traffic, above, around, and below the arrival and departure airspace required for high-performance, passenger-carrying aircraft at busy commercial service airports. This airspace is the most restrictive controlled airspace encountered by pilots operating under VFR.

In order to fly within Class B airspace, an aircraft must be equipped with special radio and navigation equipment and must obtain clearance from air traffic control. Moreover, a pilot must have at least a private pilot's certificate or be a student pilot who has met the requirements of FAR Part 61.95, which requires special ground and flight training for Class B airspace. Helicopters do not need special navigation equipment or a transponder if they operate at or below 1,000 feet and have made prior arrangements in the form of a Letter of Agreement with the FAA controlling agency. Aircraft are also required to have and utilize a Mode C transponder within a 30-nautical mile (nm) range of the center of Class B airspace. A Mode C transponder allows the ATCT to track the altitude of the aircraft.

Class C Airspace: The FAA has established Class C airspace at 120 airports around the country, including the Sunport, as a means of regulating air traffic in these areas. Class C airspace is designed to regulate the flow of uncontrolled traffic above, around, and below the arrival and departure airspace required for high-performance, passenger-carrying aircraft at some commercial service airports. In order to fly inside Class C airspace, the aircraft must have a two-way radio, an encoding transponder, and have established communication with the ATCT. Aircraft may fly below the floor of the Class C airspace, or above the Class C airspace ceiling without establishing communication with ATC. Class C airspace surrounds Albuquerque International Sunport.

Class C airspace surrounds Albuquerque International Sunport.

Class D Airspace: Class D airspace is controlled airspace surrounding airports with an ATCT, such as at Double Eagle II Airport to the northwest. The Class D airspace typically constitutes a cylinder with a horizontal radius of five miles from the airport, extending from the surface up to a designated vertical limit, typically set at approximately 2,500 feet above the airport elevation. If an airport has an instrument approach or departure, the Class D airspace sometimes extends along the approach or departure path. During periods when the airport's ATCT is closed, Class D airspace typically reverts to Class E airspace.

Class E Airspace: Class E airspace consists of controlled airspace designed to contain IFR operations near an airport, and while aircraft are transitioning between the airport and enroute environments. Unless otherwise specified, Class E airspace terminates at the base of the overlying airspace. Only aircraft operating under IFR are required to be in contact with air traffic control when operating in Class E airspace. While aircraft conducting visual flights in Class E airspace are not required to be in radio communications with air traffic control facilities, visual flight can only be conducted if minimum visibility and cloud ceilings exist.

Class G Airspace: Airspace not designated as Class A, B, C, D, or E is considered uncontrolled, or Class G, airspace. Air traffic control does not have the authority or responsibility to exercise control over air traffic within this airspace. Class G airspace lies between the surface and the overlaying Class E airspace (700 to 1,200 feet above ground level [AGL]).

Exhibit 1H shows the Class C and underlying Class E airspace surrounding Albuquerque International Sunport. The inner ring of Class C airspace consists of controlled airspace extending upward from the surface to and including 9,400 feet MSL within a five-mile radius of Albuquerque International Sunport. The outer ring generally extends for a 10-nautical mile radius and from 6,900 feet to 9,400 feet MSL. A portion of the outer ring to the east (extending over the Sandia Mountains) has a floor of 7,800 feet MSL.

SPECIAL USE AIRSPACE

Special use airspace is defined as airspace where activities must be confined because of their nature or where limitations are imposed on aircraft not taking part in those activities. The designation of special use airspace identifies for other users the areas where military activity occurs, provides for segregation of that activity from other fliers, and allows charting to keep airspace users informed. These areas are depicted on **Exhibit 1H**.

Military Operating Areas (MOAs): This special use airspace is established outside positive control areas to separate/segregate certain nonhazardous military activities from IFR traffic and to identify for VFR traffic where these activities are conducted. MOAs are established to contain certain military activities such as air combat maneuvers, air intercepts, acrobatics, etc. The Cato and Smitty MOAs are the closest to the Sunport and are approximately 80 miles to the southwest. These MOAs encompass airspace from 500 feet AGL to 13,500 feet MSL (Smitty) and from 13,500 to 17,999 feet MSL (Cato). The MOAs are in effect is from 6:00am to 10:00pm and other times by a Notice to Airmen (NOTAM). These MOAs are relatively distant from the Sunport and have little effect on air traffic in the area.

Military Training Routes: Military training routes (MTRs) are designated airspace that has been generally established for use by high performance military aircraft to train below 10,000 feet AGL and in excess of 250 knots. There are VR (visual) and IR (instrument) designated MTRs. MTRs with no segment above 1,500 feet AGL will be designated with the VR or IR, followed by a four-digit number (e.g., VR1257). MTRs with one or more segments above 1,500 feet AGL are identified by the route designation followed by a three--digit number (e.g., VR540). The arrows on the route show the direction of travel. The MTRs are not in close proximity to the Airport. VR1195 is approximately 40 miles to the east, and VR176 is approximately 60 miles to the south.

Victor Airways: For aircraft arriving or departing the regional area using very high frequency omni-directional range (VOR) facilities, a system of Federal Airways, referred to as Victor Airways, has been established. Victor Airways are corridors of airspace eight miles wide that extend upward from 1,200 feet AGL to 18,000 feet MSL and extend between VOR navigational facilities. There are numerous Victor

Airways leading to and from the Albuquerque VORTAC facility located approximately 10 miles west of the Sunport.

Wilderness Areas: While not specifically considered part of the U.S. airspace structure, the boundaries of National Parks, Wildlife Service areas, Forest Wilderness, and Primitive areas are noted on aeronautical charts. Aircraft operations are not specifically restricted over these areas; however, pilots are requested to maintain a minimum altitude of 2,000 feet above the surface. FAA Advisory Circular 91-36C defines the "surface" as the highest terrain within 2,000 feet laterally of the route of flight or the uppermost rim of a canyon or valley. The Sandia Mountain and Manzano Mountain wilderness areas are in proximity of the Sunport.

Restricted Airspace: No person may operate an aircraft within a restricted area between the designated altitudes and during the time of designation without advanced permission of the using and controlling agency. The closest Restricted Airspace is R-5107 C &H which is approximately 70 miles to the south. R-5123 is approximately 70 miles to the southwest and R-5101, which covers the Los Alamos area, is to the north.

AIRSPACE CONTROL

The FAA has established 22 Air Route Traffic Control Centers (ARTCCs) throughout the continental United States to control aircraft operating under IFR within controlled airspace and while enroute to a destination. The primary responsibility of the ARTCC is the assignment of specific routes and altitudes along Federal Airways to maintain proper separation and orderly traffic flow. Albuquerque Center, located approximately 10 miles north of the Sunport, controls enroute airspace in most of Arizona, New Mexico and parts of California, Colorado, Oklahoma, and Texas.

The Albuquerque TRACON (Terminal Radar Approach Control) is an air traffic control facility that provides safety alerts, aircraft separation, and sequencing of aircraft arriving, departing, and transitioning the airspace and airports in the New Mexico region. Albuquerque TRACON is the step between local control (on-airport control tower) and Albuquerque Center ARTCC. The Albuquerque TRACON is co-located at the base of the Sunport's airport traffic control tower (ATCT). Flight plans can be opened or closed utilizing the Albuquerque Service Station (FSS).

The Sunport ATCT operates 24 hours a day, seven days a week. The tower is owned and operated by the FAA and it is located on the Kirtland Air Force Base north of the airfield and east of the terminal building. The tower is 225 feet high. Tower controllers provide services to aircraft operating on the airfield and generally within a five-mile radius of the Sunport. Primary air traffic services for the airport are provided within the airport's Class C airspace. The ATCT also provides terminal radar coverage.

ELECTRONIC NAVIGATIONAL AIDS

Navigational aids are electronic devices that transmit radio frequencies, which pilots of properly equipped aircraft can translate into point-to-point guidance and position information. The types of electronic navigational aids available for aircraft flying to or from Albuquerque International Sunport include a very high frequency omni-directional range (VOR) facility and the global positioning system (GPS).

The VOR, in general, provides azimuth readings to pilots of properly equipped aircraft transmitting a radio signal at every degree to provide 360 individual navigational courses. Frequently, distance measuring equipment (DME) is combined with a VOR facility (VOR-DME) to provide distance as well as direction information to the pilot. Military tactical air navigation aids (TACANs) and civil VORs are commonly combined to form a VORTAC. The VORTAC provides distance and direction information to both civil and military pilots. The Albuquerque VORTAC is located approximately 10 miles to the west, and the Otto VOR is located approximately 40 miles to the east of the Sunport.

GPS is an additional navigational aid for pilots. GPS was initially developed by the United States Department of Defense for military navigation around the world. GPS differs from a VOR in that pilots are not required to navigate using a specific facility. GPS uses satellites placed in orbit around the earth to transmit electronic radio signals, which pilots of properly equipped aircraft use to determine altitude, speed, and other navigational information. With GPS, pilots can directly navigate to any airport in the country and are not required to navigate to a specific ground-based navigation facility.

Many commercial service airports are equipped with an Instrument Landing System (ILS). Runways 8 and 3 are both served by an ILS system. The ILS systems at the Sunport are comprised of dual transmitter localizer equipment and dual transmitter glideslope equipment. The localizers provide an instrument approach course for horizontal alignment with runway centerline. The glideslopes provide vertical guidance for landing aircraft. Additionally, the MALSRs serving Runways 8 and 3 provide for visual alignment the aircraft with the extended course centerline.

INSTRUMENT APPROACH PROCEDURES

Instrument approach procedures are a series of predetermined maneuvers established by the FAA, using electronic navigational aids that assist pilots in locating and landing at an airport, especially during instrument flight conditions. There are currently 13 published instrument approach procedures at the Sunport, including ILS precision instrument approaches to Runways 8 and 3. Precision instrument approaches provide vertical descent information and course guidance information to the pilot. Non-precision approaches only provide course guidance to the pilot.

There are currently 13 published instrument approach procedures

The capability of an instrument approach procedure is defined by the visibility and cloud ceiling minimums associated with the approach. Visibility minimums define the horizontal distance the pilot must be able to see in order

to complete the approach. Cloud ceilings define the lowest level a cloud layer (defined in feet above the ground) can be situated for the pilot to complete the approach. If the observed visibility or cloud ceilings are below the minimums prescribed for the approach, the pilot cannot complete the instrument approach. **Exhibit 1J** summarizes FAA approved and published instrument approach procedures, including associated weather minimums for Albuquerque International Sunport.

The most sophisticated instrument approach procedures at Albuquerque International Sunport are associated with the ILS to Runways 8 and 3. The ILS to Runway 8 provides visibility minimums as low as ½-mile (2,400 feet RVR) and cloud ceilings of 200 feet AGL (referred to as a Category I approach). Generally, this type of approach is considered the minimum for a commercial service airport. The Hi-TACAN instrument approach to Runway 8 has ⅜-mile visibility minimums; however, this procedure is available only to military aircraft.

Instrument approaches based on GPS have become very common across the country. GPS does not require a significant investment in ground-based systems by the airport or FAA. Runways 8-26 and 3-21 are served by GPS approaches with associated minima presented on **Exhibit 1J**. A variant of GPS referred to as RNP (required navigation performance) allows an aircraft to fly a specific path between two 3D-defined points in space. RNP instrument approaches allow for more efficient curved flight paths through congested airspace, around noise sensitive areas, or through difficult terrain. The Sunport has RNP instrument approaches to each runway except Runway 12-30.

TERMINAL ARRIVAL AND DEPARTURE PROCEDURES

The Airport has a variety of terminal arrival and departure procedures available. Standard terminal arrival routes (STARs) is a published procedure to be followed by aircraft on an IFR flight plan just before reaching a destination airport. The purpose of a STAR is to simplify clearance delivery procedures and facilitate transition between enroute and instrument approach procedures. STARs are usually assigned to an aircraft during the enroute phase of an IFR flight plan so that local factors such as weather or runway usage can be considered for an approaching aircraft. There are nine STARs procedures utilized at the Sunport.

Standard instrument departure (SID) routes, also known as simple departure procedures, are published flight procedures followed by pilots on an IFR flight plan immediately after takeoff from an airport. SIDs have been developed in order to optimize the route of flight when considering a variety of factors such as terrain, obstacles, noise abatement, and overall airspace management. There are 12 SIDs available for use at the Sunport.

LOCAL OPERATING PROCEDURES

Albuquerque International Sunport is situated at 5,355 feet MSL. The traffic pattern altitude for all aircraft is 7,000 feet MSL (1,645 feet AGL). Runways 26, 21, and 30 utilize a standard left traffic pattern;

	WEATHER MINIMUMS BY AIRCRAFT TYPE				
	Category A	Category B	Category C	Category D	Category E
HI-ILS or LOC Rwy 8					
ILS Straight-In 8	NA		209'/½-mile		
LOC Straight-In 8	NA		405'/½-mile		
Circling	NA		545'/1½-mile	565'/2-mile	
HI-TACAN Rwy 8					
Straight-In 8	NA		385'/⅜-mile		
Circling	NA		545'/1½-mile	565'/2-mile	
ILS or LOC Rwy 3					
ILS Straight-In 3	200'/½-mile				NA
LOC Straight-In 3	288'/½-mile			288'/¾-mile	NA
Circling	485'/1-mile		545'/1½-mile	565'/2-mile	NA
ILS or LOC Rwy 8					
ILS Straight-In 8	207'/½-mile				NA
LOC Straight-In 8	400'/½-mile		400'/¾-mile		NA
Circling	485'/1-mile		545'/1½-mile	565'/2-mile	NA
RNAV (RNP) Y Rwy 21					
RNP 0.30 DA	442'/1½-mile				NA
RNAV (RNP) Y Rwy 26					
RNP 0.15 DA	373'/1¼-mile				NA
RNAV (RNP) Z Rwy 3					
RNP 0.30 DA	259'/½-mile				NA
RNAV (RNP) Z Rwy 8					
RNP 0.30 DA	299'/½-mile				NA
RNAV (RNP) Z Rwy 21					
RNP 0.30 DA	400'/1½-mile				NA
RNAV (RNP) Z Rwy 26					
RNP 0.17 DA	400'/1¼-mile				NA
RNAV (GPS) Y Rwy 3					
LNAV/VNAV DA	268'/½-mile				NA
LNAV MDA	315'/½-mile				
Circling	485'/1-mile		545'/1½-mile	585'/2-mile	NA
RNAV (GPS) Y Rwy 8					
LNAV MDA	425'/½-mile		425'/¾-mile		NA
Circling	485'/1-mile		545'/1½-mile	585'/2-mile	NA
VOR or TACAN Rwy 8					
Straight-In 8	860'/¾-mile		860'/2-mile	860'/2¼-mile	860'/2½-mile
Circling	825'/1-mile	825'/1¼-mile	825'/2½-mile	825'/2¾-mile	825'/3-mile
	EYECE FIX MINIMUMS				
Straight-In 8	380'/½-mile			380'/1-mile	860'/2½-mile
Circling	485'/1-mile		545'/1½-mile	565'/2-mile	825'/3-mile

Aircraft categories are based on the approach speed of aircraft, which is determined as 1.3 times the stall speed in landing configuration. The approach categories are as follows:

Category A: 0-90 knots (e.g., Cessna 172)
Category B: 91-120 knots (e.g., Beechcraft KingAir)
Category C: 121-140 knots (e.g., B-737, Regional Jets,Canadair Challenger)
Category D: 141-166 knots (e.g., B-747, Gulfstream IV)
Category E: Greater than 166 knots (e.g., Certain large military or cargo aircraft)

Abbreviations:

DA - Decision Altitude (Used for vertically-guided approaches)
MDA - Minimum Descent Altitude (Used for non-precision approaches)
LNAV/RNAV/VNAV - A technical variant of GPS (Lateral, Area, Vertical Navigation)
ILS - Instrument Landing System
LOC - Localizer
GPS - Global Positioning System

Note: (xxx'/ x-mile) = Visibility (in feet)/Cloud ceiling height (in miles)
Source: U.S. Terminal Procedures,Southwest Region (Effective Nov. 13, 2014)

thus, most aircraft approaching the desired runway end follow a series of left-hand turns. Runways 8, 3, and 12 utilize a right traffic pattern.

Other local operating procedures of note include:

- The aircraft ramp north of Runway 8-26 is closed to helicopters and general aviation aircraft.
- Taxiway D north of Taxiway B is closed indefinitely.
- Air carrier ground handling is not available between the hours of 1:00am and 4:30am.
- Pilots are advised to use extreme care when taxiing north on Taxiway E1 to Runway 8 because the holding position for Runway 8-26 is co-located with the Runway 12-30 holding position prior to the Runway 12 threshold.
- Pilots are alerted to the potential for increased bird hazard from October-December and from March-May.
- Taxiway H is for military use only.
- Fighter aircraft are to turn south only on departure.
- Departures on Runway 3 are restricted and require coordination with the ATCT.
- Taxiway E5 is closed.
- Pilots are alerted to the possibility of high levels of student helicopter traffic.
- A controlled firing range area is located south of the airport.
- ARFF protection is provided by the U.S. Air Force.

Noise Abatement

The Sunport is located in proximity to residential areas; therefore, the Sunport has maintained an active and continual effort to mitigate noise generated by commercial, private, cargo, and military users. ABQ has a staff person who oversees the collection of noise complaints via a published telephone number.

For years, the most sensitive noise issue was the use of Runway 17-35, particularly approaches from and departures to the north which would place low flying aircraft over long established residential areas. In 2012, Runway 17-35 was permanently closed, primarily for safety and efficiency reasons, but as a side benefit, to also address noise-related concerns.

Current noise abatement procedures include the following:

- Departing Runway 8, all aircraft are requested to delay any turns until reaching the east end of the airport, and then climb through 6,500 feet as rapidly as possible.
- All military fighters and heavy military aircraft are asked to turn south, away from the city, when departing from Runway 8.
- Between 9:00pm and 7:00am, all aircraft departing Runway 8 are issued a right turn, weather permitting.

- From 7:00am to 9:00pm, pilots of jet aircraft departing on Runway 8 and desiring a left turn are requested to delay their turn until 13.5 nautical miles from the Albuquerque VORTAC. This procedure is only used when the cloud ceiling is 5,000 feet MSL and visibility is greater than seven miles, due to the proximity of the Sandia Mountains to the east.
- Maintenance-related or other engine testing/run-ups are only permitted in remote areas of the airport.

REGIONAL AIRPORTS

There are four public-use airports within a 35-mile radius. Information pertaining to each airport was obtained from FAA records, with a summary provided on **Exhibit 1K**. None of these airports offer a comparable level of facilities and/or aviation services to the Sunport. The next closest commercial service airport is in Santa Fe, approximately 50 miles to the northeast. In addition to the public-use airports, there are several private landing strips in the region, including Manzano-Mountain Air Ranch (NM89) located 19 miles to the southeast, Biplane Ranch Airport (NM02) located 26 miles to the southeast, and New Mexico Soaring Ranch Airport (NM61) located 26 miles to the northeast. Each of these has an unpaved landing surface, few based aircraft, and no instrument approach capability.

In addition to the Sunport, the Aviation Department also operates Double Eagle II Airport. It is the policy of the Aviation Department to encourage the use of Double Eagle II Airport by general aviation operators. Double Eagle II Airport was specifically constructed to serve as a general aviation reliever airport for the Sunport. In fact, it is the only reliever airport in the state of New Mexico. As a reliever airport, Double Eagle II Airport is expected to relieve traffic at the Sunport by providing an alternate landing area for general aviation aircraft.

PASSENGER TERMINAL COMPLEX

The passenger terminal complex is the most prominent element of a commercial service airport. It provides that critical link between air travel and ground travel. The terminal complex includes the terminal building, access to the terminal building, and parking as well as access to passenger aircraft and the aircraft parking apron.

TERMINAL BUILDING HISTORY

The first terminal built for scheduled airline service was constructed in 1939 as part of a Works Projects Administration (WPA) project. This genuine adobe structure still exists and is listed in the National Register of Historic Buildings. It was renovated in 1999. The majority of the building is leased to the TSA with a portion remaining open to the public. The original terminal building is located to the west of the current terminal building and adjacent to the air freight building.

Double Eagle II (AEG) - 12 miles NW of ABQ

Airport Classification: Publically Owned/Public Use
NPIAS ..... Reliever
FAA GA Asset Study ..... Regional
NMASP ..... Regional General Aviation
Elevation ..... 5,837′
Weather Reporting WX-AWOS-3PT
ATCT ..... Yes (6:00am-7:00pm)
Annual Operations 131,400
Based Aircraft 125

RUNWAYS	4-22	17-35
Length	7,398′	5,993′
Width	100′	100′
Pavement Strength (lbs.)		
SWL	30,000	30,000
DWL	NA	NA
DTWL	NA	NA
Lighting	MIRL	MIRL
Marking	Precision	Non-precision
Approach Aids	PAPI-4L (4); MALSR (22)	PAPI-4L (17)
Instrument Approach Procedures	ILS (22); RNAV-GPS (22)	None

Services Provided ..... Fuel, Maintenance and Repair, Hangar Storage, Tiedowns, Charter, Flight Training, Aircraft Rental, Aircraft Sales.

Alexander Municipal Airport (E80) - 30 miles SW of ABQ

Airport Classification: Publically Owned/Public Use
NPIAS ..... General Aviation
FAA GA Asset Study ..... Local
NMASP ..... Regional General Aviation
Elevation ..... 5,194′
Weather Reporting WX-AWOS-3PT
ATCT ..... None
Annual Operations 17,500
Based Aircraft 53

RUNWAYS	3-21
Length	6,601′
Width	60′
Pavement Strength (lbs.)	
SWL	12,500
DWL	NA
DTWL	NA
Lighting	MIRL
Marking	Non-precision (21); Basic (3)
Approach Aids	PLASI (21)
Instrument Approach Procedures	RNAV-GPS (21)

Services Provided ..... Fuel, Maintenance and Repair, Hangar Storage, Tiedowns, Flight Training, Aircraft Rental.

Santa Fe Municipal (SAF) - 50 miles NE of ABQ

Airport Classification: Publically Owned/Public Use
NPIAS ..... Primary Commercial Service
FAA GA Asset Study ..... NA
NMASP ..... Primary Commercial Service
Elevation ..... 6,348'
Weather Reporting ..... WX-ASOS
ATCT ..... Yes (6:00am-10:00pm)
Annual Operations 71,900
Based Aircraft 207

RUNWAYS	2-20	15-33	10-28
Length	8,366'	6,316'	6,301'
Width	150'	100'	75'
Pavement Strength (lbs.)			
SWL	48,000	48,000	30,000
DWL	65,000	65,000	NA
DTWL	105,000	105,000	NA
Lighting	MIRL	MIRL	MIRL
Marking	Precision	Non-precision	Non-precision
Approach Aids	VASI-4L	PLASI(15); VASI-4R(33)	NA
Instrument Approach Procedures	ILS or LOC (2); RNAV-GPS	RNAV-GPS	RNAV-GPS (28); VOR (33)

Services Provided Fuel, Maintenance and Repair, Hangar Storage, Tiedowns, Charter, Flight Training, Aircraft Rental, Aircraft Sales.

Mid Valley Airpark (E98) - 21 miles S of ABQ

Airport Classification: Privately Owned/Public Use
NPIAS ..... NA
FAA GA Asset Study ..... NA
NMASP ..... NA
Elevation ..... 4,836′
Weather Reporting ..... None
ATCT ..... None
Annual Operations 20,100
Based Aircraft 238

RUNWAYS	18-36
Length	4,340′
Width	37′
Pavement Strength (lbs.)	
SWL	12,500
DWL	NA
DTWL	NA
Lighting	LIRL
Marking	Basic
Approach Aids	NA
Instrument Approach Procedures	NA

Services Provided ..... Fuel (Avgas)

Moriarity Airport (0E0) - 35 miles E of ABQ

Airport Classification: Publically Owned/Public Use
NPIAS ..... General Aviation
FAA GA Asset Study ..... Local
NMASP ..... Community General Aviation
Elevation ..... 6,199′
Weather Reporting WX-AWOS-3PT
ATCT ..... None
Annual Operations 29,600
Based Aircraft 137

RUNWAYS	8-26	18-36
Length	7,700′	6,200′
Width	75′	75′
Pavement Strength (lbs.)		
SWL	30,000	12,500
DWL	60,000	NA
DTWL	NA	NA
Lighting	MIRL	NA
Marking	Non-Precision	Basic
Approach Aids	NA	NA
Instrument Approach Procedures	NA	NA

Services Provided ..... Fuel, Maintenance and Repair, Hangar Storage, Tiedowns, Aircraft Sales, Glider Activity.

KEY

ASOS	-	Automated Surface Observation System
ATCT	-	Airport Traffic Control Tower
AWOS	-	Automated Weather Observation System
DME	-	Distance Measuring Equipmenet
DWL	-	Dual Wheel Loading
DTWL	-	Dual Tandem Wheel Loading
HIRL	-	High Intensity Runway Lighting
ILS	-	Instrument Landing System
LIRL	-	Low Intensity Runway Lights
LOC	-	Localizer
MALSR	-	Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
MIRL	-	Medium Intensity Runway Lighting
NMASP	-	New Mexico Airport System Plan (2009)
NPIAS	-	National Plan of Integrated Airport Systems
ODALS	-	Omnidirectional Approach Lighting System
PAPI	-	Precision Approach Path Indicator
PLASI	-	Pulsating Light Approach Slope Indicator
REIL	-	Runway End Identifier Lights
RNAV	-	Area Navigation (GPS variant)
SWL	-	Single Wheel Loading
VASI	-	Visual Approach Slope Indicator
VOR	-	VHF Omnidirectional Range

This page intentionally left blank

A new and larger terminal was constructed in 1965 to accommodate growing demand for air service. This terminal, also built in the southwest style, consisted of a passenger handling building one level below the apron. After ticketing, passengers would circulate to the center of the building, then up to the Great Hall passenger holdroom or by tunnel under the apron to a "satellite building" common passenger holdroom. Aircraft were ground-boarded from both the Great Hall and the satellite. Surface parking was located immediately across the road north of the terminal. Baggage claim was adjacent to ticketing with baggage make-up behind, accessed via a ramp from the apron. Concessions were located on both sides of the Great Hall.

The current Sunport terminal design was initiated in 1985 and construction was completed 1989. The project included modification and additions to the 1965 terminal. Ticketing and departures processing were moved to a remodeled and expanded second level at the apron level on both sides of the Great Hall, and an adjacent upper Departures Drive was added to improve curb frontage. The existing on-grade terminal was modified and expanded to accommodate additional baggage claim capacity. The Great Hall was retained as the central feature and primary circulation node. The tunnel and the satellite building were abandoned and replaced by an above-grade circulation link to a nineteen-gate concourse. Commuter carriers are accommodated in expanded facilities to the south of the Great Hall. The $120 million renovation, including the two-level drives and parking structure, more than doubled the size of the terminal and provided second level loading for major carrier jet aircraft.

CHANGES AND ADDITIONS

In 1997, four new gates were added to the east end of Concourse A with supporting restroom and additional concessions space. The project included 20,055 square feet at level two, and 2,385 square feet of enclosed space plus 17,670 square feet of covered unenclosed space at apron level.

In 1998, the Observation Deck and Food Court were added between concourse A and B. The project area included 4,570 square feet of new observation space on a mezzanine with access from the concourse by a glass sided elevator and two open stairs. The food court and seating area at the concourse total 6,670 square feet of remodeled space.

In 2000, the C Concourse at the west end of the terminal was decommissioned. Four gates were removed, the passenger hold room on Level 3 was converted to Planning & Development offices for the

Aviation Department, and the western portion concourse was abandoned. The airline operations offices on Level 2 were repurposed for the Aviation Police. The western portion of the C Concourse was subsequently demolished in 2008.

In response to the events of 9/11, security screening at the terminal was expanded with the addition of a centralized passenger security checkpoint constructed in 2004. Located on Level 3 between the terminal Level 3 Lobby and the A & B Concourses and adjacent to the circulation crossover, the 37,000 square foot facility incorporated 8 screening stations, passenger queuing, and TSA operations offices. It also included 5 sophisticated revolving security doors, security gates, and a holding area for individuals waiting for arriving passengers. Gate B2 was decommissioned to accommodate the checkpoint. TSA screening operations were also incorporated into the commercial air carrier's Outbound Baggage make-up areas in conjunction with the ticketing process. In one instance, existing space adjacent to the Great Hall was repurposed for this use.

The FIDS/BIDS project was completed in 2007. It updated the flight information display system and baggage information system throughout the terminal. It included new LED displays, the architectural supporting structure for them, new airline boarding casework at each of the gates, as well as systems software upgrades.

During 2009-2012, the A & B Concourses hold rooms and restrooms were repositioned and enlarged at strategic locations to better accommodate the traveling public and the commercial air carriers. This was accomplished with small building additions and phased construction, and it also included removal of Gate B2. Many of the concourse restrooms were completely remodeled with new fixtures, finishes, and accessories. Several retail and food & beverage concessions spaces were similarly repositioned and refurbished during this period.

Between 2003 and 2014, numerous smaller remodeling projects were undertaken to further optimize the terminal and accommodate operational changes within the airline industry. They typically included replacement of mechanical units, ductwork, plumbing fixtures and service lines, power, lighting and special systems wiring. Projects include the following:

- The existing retail concessions spaces on Level 3 were enlarged and refurbished on several occasions to increase their visibility and sales volume, with more square footage devoted to them, and with 3 spaces on the non-secured and 3 spaces on the secured side of the terminal. This project also included 2 small retail kiosks in the Great Hall, Level 2, and 5 within Concourses A & B on Level 3.

- The food & beverage concessions spaces throughout the terminal on Level 3 were similarly refurbished and/or expanded, including the main restaurant off the Level 3 Lobby and the Food Court at the confluence of the A and B Concourses by the observation deck.

- The centralized kitchen west of the restaurant on Level 3 was decommissioned and removed.

- The commuter airline ticketing area at the south end of the Great Hall was decommissioned as was the D Concourse. Portions of it were repurposed for airport operations, including the Communications Center, Security Badging Office, and IT Office Suite.

- All public restrooms throughout the terminal were completely remodeled with new fixtures, finishes, and accessories during this period, either as stand-alone projects or in conjunction with other projects. The scope included upgrades such as the ADA requirement for family restrooms and hands-free fixture actuation.

- The Level 2 Airport Operations/Emergency Response Center was renovated with new restrooms, break area and new finishes throughout.

- Out on the Level 2 ramp, the airline ground operations common service corridors and restrooms were also renovated.

- The terminal Level 2 West End was also renovated to enhance several airport operations. Several projects enlarged and reconfigured the U.S. Customs and Border Patrol suite and created the Sandia Vista conference center.

- Light fixtures in many of the public spaces have been replaced with LED fixtures.

- The fire/smoke detection and alarm system has been recently upgraded.

- Wi-Fi has also been installed throughout the terminal.

- The existing terminal roofs have been replaced. The roofing system consists of a new single-ply, 80mil EPDM membrane with a light-colored UV coating over R-30 rigid insulation and includes an extended warranty.

- The parking structure has been upgraded with new photovoltaic arrays on the upper deck parking canopies. The long-term parking lot was also fitted with structurally supported photovoltaic arrays above the parking stalls.

There are several terminal building improvement projects which are being designed and constructed in 2015-2016. The major project is to the ticketing, baggage, departures and arrivals areas. There are several smaller projects in process as well.

The ticketing areas on Level 2 and the baggage areas on Level 1 are being remodeled, refreshed, and updated to accommodate industry changes to these processes, to enrich the passenger experience, and to enhance the airport terminal's uniquely New Mexico architectural vernacular. The work includes new ticketing casework, baggage handling equipment, skylights, ceiling finishes, lighting, HVAC distribution and way finding signage from the entrance/exit vestibules to the Great Hall. In conjunction with the ticketing and baggage enhancements, the terminal's exterior function and appearance at Departure Level 2 and Arrival Level 1 are also being upgraded.

At Departure Level 2, the exterior curbside check-in is being rearranged to streamline the process while minimizing pedestrian congestion at the terminal entrances, and to make the entrances more visible and inviting. A canopy is being added to the trellis, with integral drainage and lighting, to provide cover for the sidewalk and check-in queuing areas.

On Arrival Level 1, various elements are being incorporated to improve arrival passengers' movement and experience from the baggage claim areas to private and commercial pick-up areas. The project includes stepped ceiling projections at the exit vestibules similar to the entrance porticos, wider passenger pick-up sidewalks with enhanced lighting, an exposed and well lighted elevated roadway deck, and defined crosswalks to the commercial pick-up area with a covered terminus at each. The commercial pick-up area includes a covered trellis similar to the Departures level, windscreens, seating and landscaping. In conjunction with this work, the Parking Structure is also being refreshed with repairs to brick pavers, Stairs 1 and 2, and other cosmetic upgrades including painting and cleaning.

The smaller remodeling projects being undertaken to further optimize the terminal are as follows:

- Changes in the information technology industry and heightened security necessitated additional spatial needs for the IT Offices and Security Badging. IT Offices are being relocated to the vacated former Kitchen on Level 3 and the Security Badging Offices will expand in to the area formerly occupied by the IT Offices. The former D Concourse holding room is also being repurposed for an employee fitness center.

- The Aviation Police Suite at the west end of Terminal Level 2 is being completely remodeled, which includes minor remodeling on both Level 1 and Level 3.

- The HVAC equipment in 11 mechanical penthouses serving the landside portion of the terminal are being refurbished and upgraded with larger more efficient coils, fans and ductwork, as are the spaces themselves.

- The Central Utility Plant (CUP) project is replacing the boilers within the existing Boiler Room with new hybrid type units.

- The Shared Tenant Services (STS) project expands and unifies the Aviation Departments' telephone and data system throughout the terminal to allow access by its tenants.

- Forty-four (44) apron light poles about the terminal have been inspected and are being repaired where damaged, or replaced, reconditioned, and refinished.

- The Apron Concrete Reconstruction Phase III project will be completed in 2015-2016.

- The parking structure is being upgraded with new lighting on each level. A new fire/smoke detection and alarm system will also be installed in the Parking Structure.

- The Parking Office Building is being refreshed with new finishes including, a new roof and LED lights at the exit booths.

- The Parking Exit Plaza is being reconfigured with the six existing lanes reduced to five lanes and realigned, removal of the existing toll booths and canopy, and their replacement with new toll booths and canopy. Installed west of the original location, this will create space for additional vehicle queuing and improve the exiting process.

- Deficiencies with the exterior directional signage on the building and to the airport roadways and parking signage at the Sunport are being upgraded.

- Finally, the four employee parking lots are being reconstructed in 2015-2016. The existing asphalt paving is being removed, the lots re-graded and resurfaced, with new entrance/exit gates and lighting.

With the completion of these projects, the public spaces within the terminal will have been renovated, remodeled, refreshed or otherwise upgraded within the last five to 10 years. With routine maintenance, these spaces should remain attractive and serviceable for another 10 to 20 years. In the coming years, the Aviation Department anticipates minor projects to continuously upgrade the terminal as the needs arise and in response to changes within the industry.

TERMINAL ARCHITECTURE

Form and Massing: The terminal is composed of rectangular volumes decreasing in size at each level. The building elements are detailed to recall traditional adobe construction, and the overall stacking of the building is a contemporary interpretation of the Southwest Pueblo architectural style.

Color and Materials: The colors of the terminal are inspired by the colors of the natural environment. The colors used include shades of blue, green, lavender, and pink. The exterior of the airport is a buff color, inspired by the earth native to the area. Blue and turquoise accents are used throughout the terminal and its signage system. These colors strongly evoke the southwest, the wide expanse of sky, and regional turquoise jewelry. Blue is used on doors, railings, and windows throughout the airport. Turquoise is used on the loading bridges and in the airport signage.

The interior walls in the terminal are finished with plaster and painted off-white with a hint of red/brown adobe (Sunport Doeskin). In contrast to the solidity of the walls, the ceilings are articulated in textured wood slat ceiling panels inspired by regional beam and latilla construction and the floors are done in a brick pattern inspired by Indian weavings.

Furnishing and Interiors: Seating areas, both in the ticketing & baggage claim lobbies, are denoted by the placement of woven rugs. Seating in these areas consist of low cube-like cushioned ottomans, with similarly designed tables. The ottomans and tables are made of precast concrete. The ottoman's cushions are covered in patterned blue fabric, and the table has a matching blue plastic laminate top.

The seating in the Great Hall and passenger hold rooms incorporated original wood frame and leather cushion chairs as were designed for the airport in 1965. The original chairs were reconditioned and newer furniture has been fabricated to match. The chairs come in units of two and four. Four chairs typically make up a row and the chairs are placed back to back.

The geometry of Indian motifs and patterns also appear throughout the airport in the detailing for casework, flight information displays, railings, signage and advertising framework. The wing form inspired the design of light fixtures, balcony railings and the signage gateway located in the Great Hall as well as the current Sunport logo.

Wayfinding and Signage: The airport terminal is divided into three basic circulation spines. The ticketing and baggage avenues, which run east/west, are stacked one above the other on Levels 2 and 1, respectively. The ticketing/baggage functions are located to the south side, waiting/support alcoves and the entrance/exit vestibules to the north side, with departures/arrival lanes beyond. They connect to the main north/south boulevard which extends from the parking structure tunnel, through the baggage claim lobby, the Great Hall, upper Level 3 lobby, and seamlessly flows into the security checkpoint/crossover. The latter connect at the confluence of the A & B Concourses which run east/west. The concourses contain a mix of passenger gates, hold rooms, restrooms, and concessionaires on both sides of the passenger street.

For the most part, the ceilings of these elements share a similar treatment. Wood slat ceiling panels were used throughout to define all paths of public circulation. Adjacent areas, such as ticketing, baggage, and the hold rooms, have an acoustical ceiling tile treatment and somewhat lower height. At the juncture of the three circulation elements, the areas of intersection are emphasized with taller and wider spaces, often with stepped ceilings. At the intersection of the ticketing and baggage avenues with the main boulevard, passengers find themselves in the midst of the Great Hall and upper Level 3 lobby, bathed in natural light from clerestory windows with the airport's art collection, retail, and food & beverage concessions readily visible. The boulevard splays out laterally to form the security checkpoint and crossover. The checkpoint itself is a large open hall with stepped ceilings. Where the main boulevard

intersects with the A and B Concourses, passengers move into a taller and wider space which opens up to reveal the observation lounge, the food court, retail concessionaires, and a major sculptural piece, bathed in natural light from a large skylight above.

These points of intersection are also reinforced by the terminal's floor pattern. The floor is paved with brick, a material common with contemporary southwest architectural styles. At locations where the paths of circulation cross, the intersection is expressed with a change in the brick pattern.

Using these materials and volumes, the architecture helps signify to passengers the major pathways and wayfinding decision points.

The signage in the terminal installed with the 1989 terminal expansion is extremely legible. The directional and identification signage has a turquoise background, with large white lettering and three small pink squares designed into each corner of the signs. The serif font suggests an ornamental flourish typical of the metal work of the region. Signage is located high in the circulation spaces and is typically lighted from linear fixtures above. The Aviation Department entertained an updated signage template, turquoise text on a white translucent background, which was partially implemented. It was found to be less visible than the 1989 template. The updated template has been incorporated but limited to room identification signage (restrooms). The updated template incorporates English and Spanish text and conforms to accessibility requirements. Interior directional and identification signage is generally consistent throughout the terminal, and the Aviation Department has no immediate plans to further update it.

The 1989 template extends to the exterior directional signage on the building and to the airport roadways and parking signage at the Sunport. The Aviation Department has identified several deficiencies with airport roadway and parking signage, has a plan in place to replace/reconfigure and enhance site signage, and is in the process of implementing it.

TERMINAL ORGANIZATION

As mentioned previously, the terminal is organized into four major elements. The first element is a landside passenger departure and arrivals processing element which runs east/west adjacent to and level with their corresponding driveways. The second element is a circulation spine which runs north/south from the center of the processing element extending south to the center of the third element. The third element, the airside concourse, also runs east/west, parallel to the first element. The fourth element, the four-level parking structure, also runs east/west, parallel to and north of the first element and driveways.

Terminal Level 1

Level 1 is dedicated to the passenger arrivals functions of baggage claim and ground transportation and is connected to and parallel with the arrivals roadway. Level 1 is located below the apron level and passenger access is from the Great Hall above by way of escalators, elevators and stairs to its center point. Baggage is delivered to the south side of the claim space by way of a baggage tug tunnel accessible

Level 1 is dedicated to the passenger arrivals functions of baggage claim and ground transportation.

from the apron. Delivery of baggage from the tunnel to each claim device is by way of a conveyor below the claim level floor. From baggage claim, arrival passengers exit the terminal north to the vehicle pick-up area and ground transportation area, or continue downward by way of escalators, elevators and stairs to the access tunnel and parking structure beyond. Rental car services have been consolidated at a remote location and are accessed by shuttle from the ground transportation area. The west end of Level 1 is devoted to airport operations including the main receiving dock and building maintenance functions. The floor area of Level 1 is approximately 135,000 square feet including the tug tunnel and the tunnel access to the parking structure. **Exhibit 1L** depicts the Level 1 floor plan.

Terminal Level 2

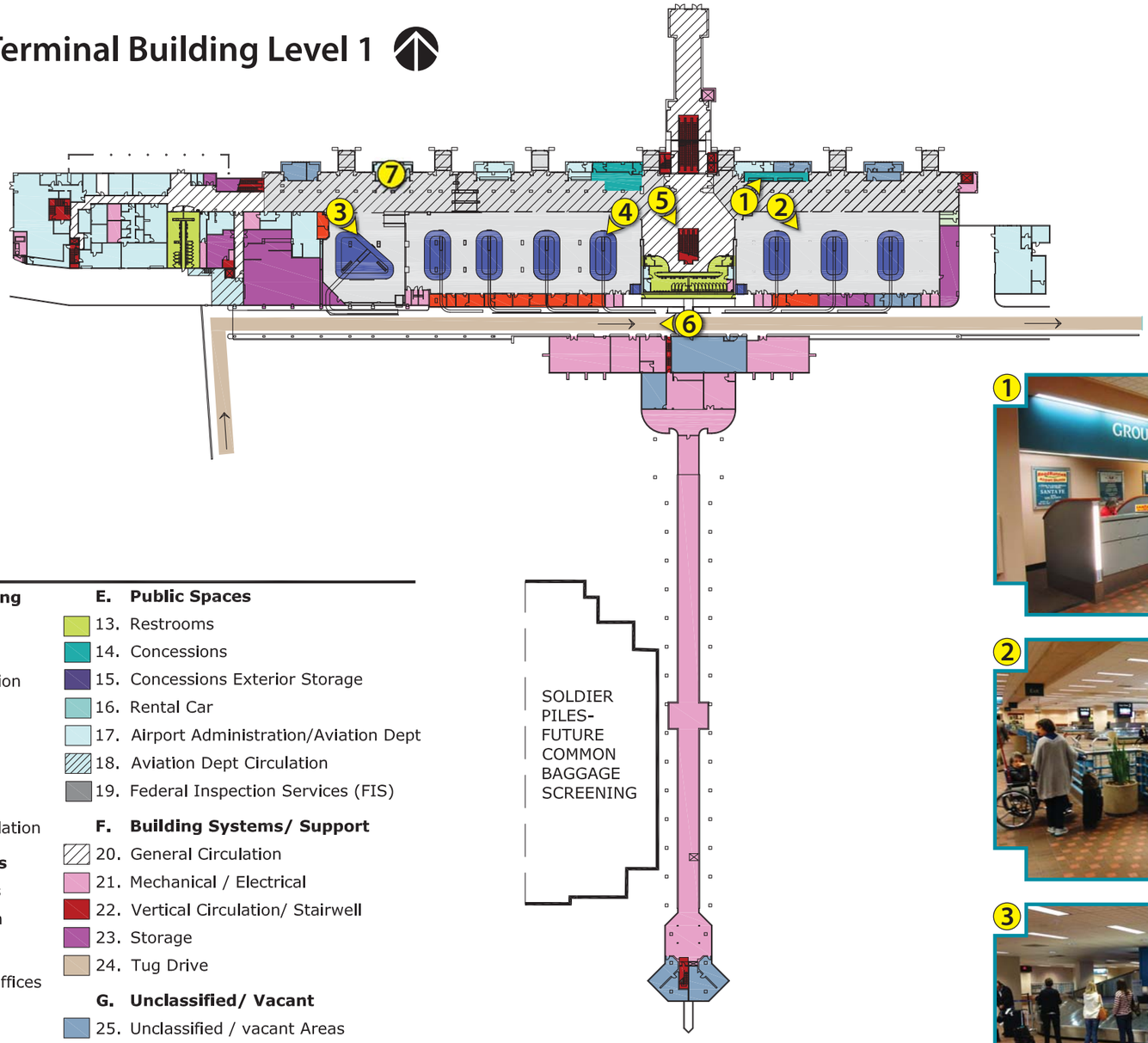
Level 2 of the terminal, located at the apron elevation, is linked to the second level of the structured departures roadway by seven vestibule bridges. The northern landside portion is dedicated to the processing of departing passengers and their baggage, otherwise known as ticketing. The Great Hall, at the center of landside functions, was the major common hold room for the 1965 terminal configuration. Currently, all passengers and the general public circulate to and through the Great Hall. In addition to being the terminal's primary circulation element, the Great Hall also functions as a major public space used for waiting, entertainment, and art display. The airside functions on this level are devoted to outbound baggage handling and airline operations space. Airport operations in the vicinity of the Great Hall include the press room, family assistance center, security badging, the communications center, fitness center, and the airport operations/emergency response center. The far west end of Level 2 contains the U.S. Customs and Border Patrol offices and arrivals gate, the Aviation Police office, and other airport operations functions. Level 2 below the A and B Concourses contain airline ground service operations offices, equipment, and concessions storage. The floor area of Level 2 is approximately 258,000 square feet including covered unenclosed areas and tug drives under the building. **Exhibit 1M** depicts the Level 2 floor plan.

Terminal Level 3

Level 3 consists of four distinct areas: the Level 3 lobby (non-secured), the security checkpoint and crossover (secured), the A & B Concourses (secured), and the terminal west end (non-secured).

The Level 3 lobby is the southern extension of the Great Hall and is connected to it by escalators, elevators and stairs. The lobby is flanked on the east by retail concessions, restrooms, and the airport administrative offices. The west side is predominantly food and beverage services, restrooms, and access to secured airport operations farther west. At the south end of the lobby, departing passengers flow southwest into the security checkpoint. Arriving passengers move from the crossover through the security exit directly into the lobby. From there, passengers are reunited with family and friends waiting in a

Terminal Building Level 1



Lease Area Legend

A. Departure Processing
- 1. Ticket Counters
- 2. Ticket Lobby
- 3. Ticket Lobby Circulation
- 4. Security Stations

B. Arrival Processing
- 5. Baggage Claim
- 6. Claim Lobby
- 7. Baggage Lobby Circulation

C. Concourse Facilities
- 8. Passenger Holdrooms
- 9. Concourse Circulation

D. Airline Operations
- 10. Back Office / Ramp Offices
- 11. Baggage Outbound
- 12. Unenclosed Storage

E. Public Spaces
- 13. Restrooms
- 14. Concessions
- 15. Concessions Exterior Storage
- 16. Rental Car
- 17. Airport Administration/Aviation Dept
- 18. Aviation Dept Circulation
- 19. Federal Inspection Services (FIS)

F. Building Systems/ Support
- 20. General Circulation
- 21. Mechanical / Electrical
- 22. Vertical Circulation/ Stairwell
- 23. Storage
- 24. Tug Drive

G. Unclassified/ Vacant
- 25. Unclassified / vacant Areas

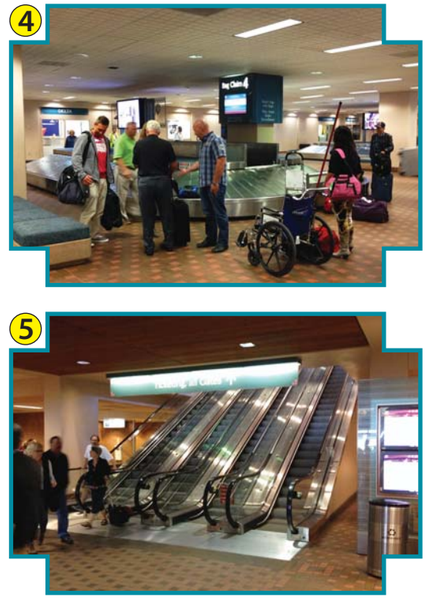


Exhibit 1L
TERMINAL BUILDING LAYOUT 1ST FLOOR

This page intentionally left blank

Terminal Building Level 2

Lease Area Legend

A. Departure Processing

1. Ticket Counters
2. Ticket Lobby
3. Ticket Lobby Circulation
4. Security Stations

B. Arrival Processing

5. Baggage Claim
6. Claim Lobby
7. Baggage Lobby Circulation

C. Concourse Facilities

8. Passenger Holdrooms
9. Concourse Circulation

D. Airline Operations

10. Back Office / Ramp Offices
11. Baggage Outbound
12. Unenclosed Storage

E. Public Spaces

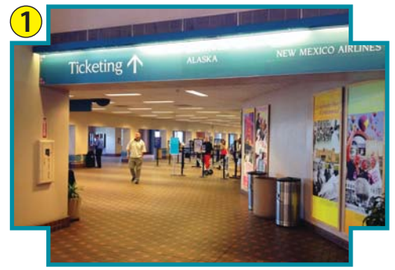
13. Restrooms
14. Concessions
15. Concessions Exterior Storage
16. Rental Car
17. Airport Administration/Aviation Dept
18. Aviation Dept Circulation
19. Federal Inspection Services (FIS)

F. Building Systems/ Support

20. General Circulation
21. Mechanical / Electrical
22. Vertical Circulation/ Stairwell
23. Storage
24. Tug Drive

G. Unclassified/ Vacant

25. Unclassified / vacant Areas

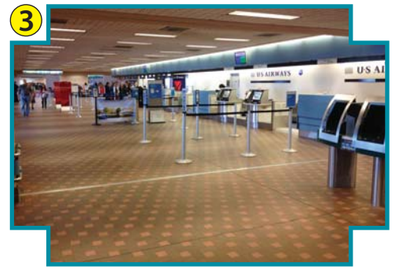


1

5

2

6



3

7

4

8

Exhibit 1M
TERMINAL BUILDING LAYOUT 2ND FLOOR

This page intentionally left blank

special hold room immediately to the east of the security exit and/or continue north and downward to the baggage level.

The security checkpoint and crossover form the connecting bridge between the non-secured landside and secured airside of the terminal, one story above the apron level. The security checkpoint is itself a large open hall with gracious space for departing passenger queuing, the 8 screening stations, post-screening functions and TSA operations. This space feeds back into the crossover and the A and B Concourses just north of their confluence. The crossover for arriving passengers extends from the A and B Concourses to the security exit at the south end of the Level 3 lobby. It is essentially a pedestrian corridor with a moving walkway and windows to the east side, windows into the checkpoint to the west side, and a wide walking area between them.

The A and B Concourses branch out in an east/west direction perpendicular to the crossover at their confluence. This terminus is a focal point for secured airside retail and food & beverage concessions. Each concourse consists of a central passenger street flanked on each side by groupings of airline gates and hold rooms, with restrooms and concession services between them. There is a total of 22 gates, with 13 on the A Concourse and 9 on the B Concourse.

The terminal west end, accessed by stairs and an elevator, contains the Aviation Department Planning and Development office suite and a mechanical air handling room.

The floor area of Level 3 is approximately 243,000 square feet, excluding the mezzanine observation lounge and mechanical penthouses. **Exhibit 1N** depicts the Level 3 floor plan.

Terminal Level 4

At the confluence of the A and B Concourses, the observation lounge is a mezzanine located above the food and beverage concessions with views to the south side apron and runway beyond. It is accessed by an elevator, which is a prominent architectural feature, as well as an adjacent stair. The observation lounge is approximately 3,800 square feet.

There is a total of 20 mechanical penthouses serving the terminal. There are six units on the roof over Level 2: two units to the east of the Great Hall and four to the west. These penthouses serve both the baggage claim at Level 1 and ticketing at Level 2. There are 14 mechanical penthouses located on the roof above Level 3. Five of these penthouses serve the areas on Level 2 and Level 3 located south of the Great Hall. Two of these penthouses serve the security checkpoint. Seven of these penthouses serve the enclosed operations

spaces at Level 2 and the A and B Concourses at Level 3. Each penthouse contains multiple air handling units, filtration and other associated equipment. Hot and cold water is supplied to the rooftop units from the central boiler and chiller rooms located at the south side of the baggage tunnel at Level 1. In total, the penthouses are approximately 60,500 square feet. **Exhibit 1P** presents the floor plan of the level four elements.

Terminal Building Summary

The terminal building encompasses nearly 700,000 square feet of space. **Table 1E** shows how much space is dedicated to the major element of the facility.

TABLE 1E
Terminal Building Space Allocation
Albuquerque International Sunport

Functional Area	Level 1	Level 2	Level 3	Level 4	Total
Ticket Counter	0	3,770	0	0	**3,770**
Ticket Lobby	0	5,515	0	0	**5,515**
Ticket Lobby Circulation	0	25,301	0	0	**25,301**
Security Station	211	598	26,696	0	**27,505**
Bag Claim Area	8,181	0	0	0	**8,181**
Bag Claim Lobby	43,656	0	0	0	**43,656**
Passenger Hold Room	0	3,803	55,049	3,286	**62,138**
Concourse Circulation	0	1,228	32,568	0	**33,796**
Airline Back Office	2,508	29,872	0	0	**32,380**
Baggage Outbound	0	21,714	0	0	**21,714**
Airline Unenclosed Storage	0	24,928	0	0	**24,928**
Restrooms	3,609	4,228	17,620	0	**25,457**
Concessions	1,495	6,779	43,928	475	**52,677**
Concession Exterior Storage	0	1,693	0	0	**1,693**
Rental Car	0	0	0	0	**0**
Airport Administration	15,559	34,316	25,245	0	**75,120**
Airport Department Circulation	902	2,804	8,853	0	**12,559**
Federal Inspection Services	0	7,639	0	0	**7,639**
General Circulation	11,055	21,668	16,654	0	**49,377**
Mechanical/Electrical	21,306	9,404	1,670	55,187	**87,567**
Vertical Circulation	3,234	12,475	10,893	1,293	**27,895**
Aviation Storage	6,862	3,626	1,057	267	**11,812**
Tug Drive	10,726	20,696	0	0	**31,422**
Unclassified/Vacant Areas	5,859	15,590	2,527	0	**23,976**
TOTAL	**135,163**	**257,647**	**242,760**	**60,508**	**696,078**

Source: SMPC Architects

Terminal Building Level 3

Lease Area Legend

A. Departure Processing
1. Ticket Counters
2. Ticket Lobby
3. Ticket Lobby Circulation
4. Security Stations

B. Arrival Processing
5. Baggage Claim
6. Claim Lobby
7. Baggage Lobby Circulation

C. Concourse Facilities
8. Passenger Holdrooms
9. Concourse Circulation

D. Airline Operations
10. Back Office / Ramp Offices
11. Baggage Outbound
12. Unenclosed Storage

E. Public Spaces
13. Restrooms
14. Concessions
15. Concessions Exterior Storage
16. Rental Car
17. Airport Administration/Aviation Dept
18. Aviation Dept Circulation
19. Federal Inspection Services (FIS)

F. Building Systems/ Support
20. General Circulation
21. Mechanical / Electrical
22. Vertical Circulation/ Stairwell
23. Storage
24. Tug Drive

G. Unclassified/ Vacant
25. Unclassified / vacant Areas

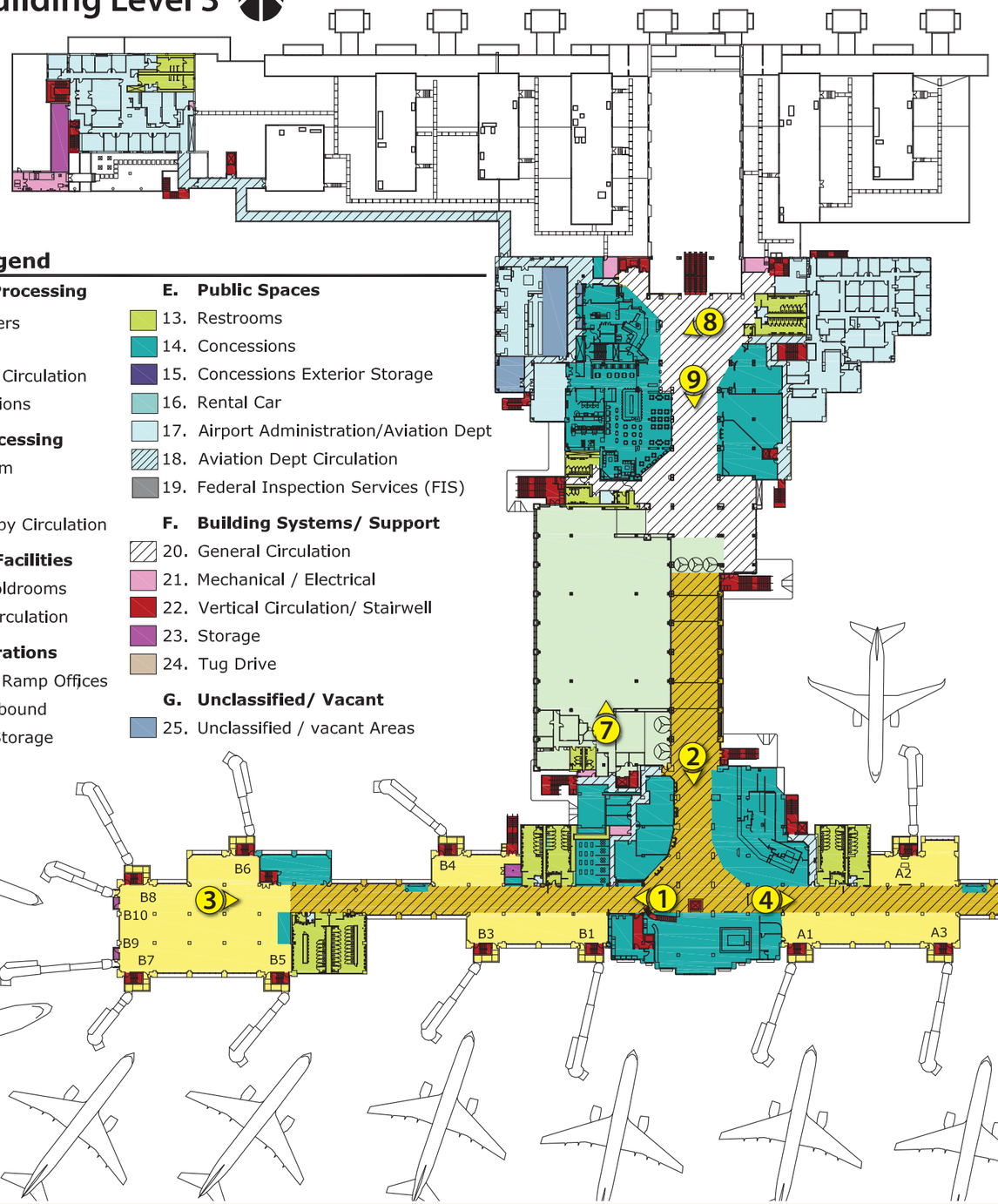
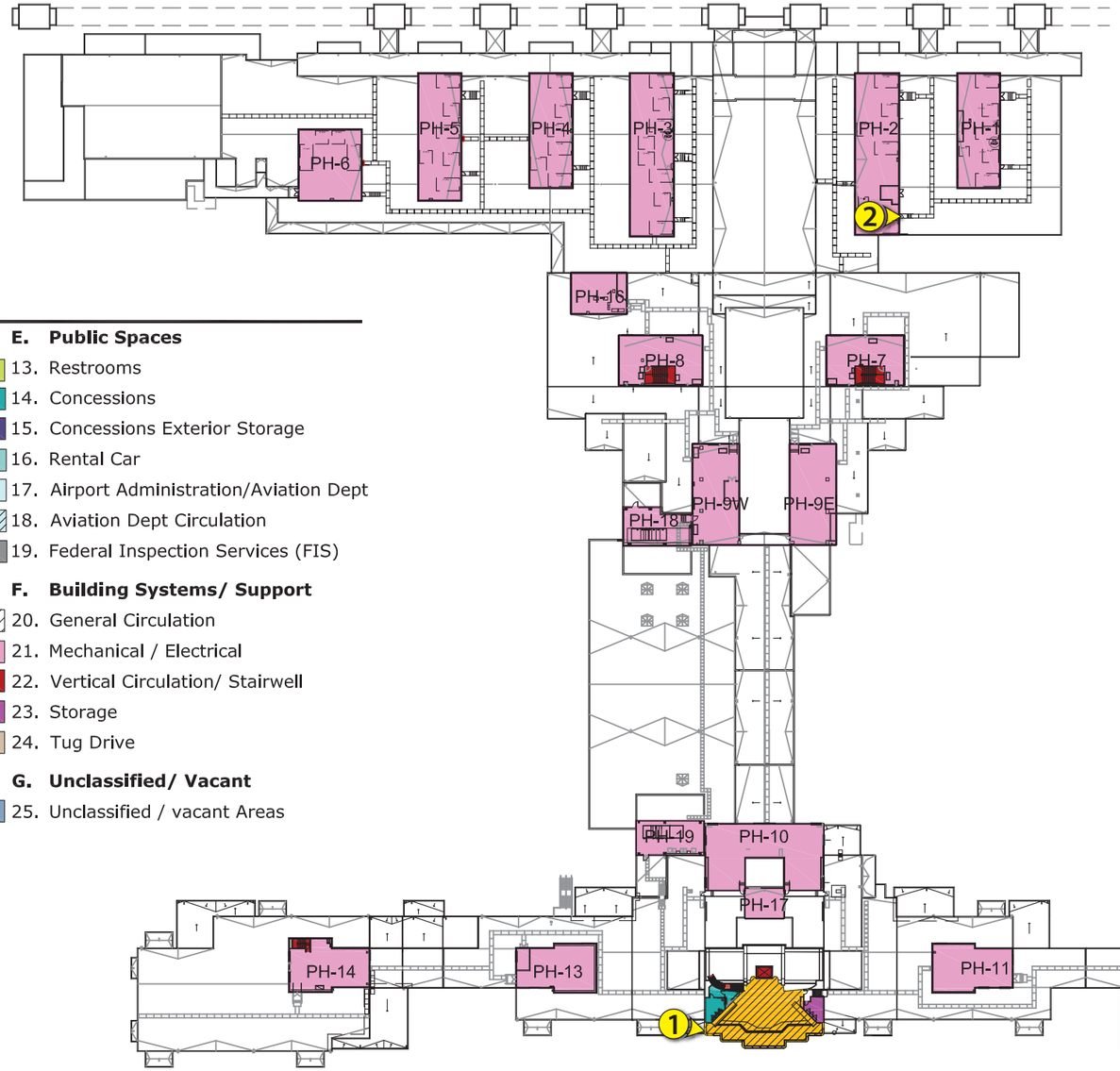


Exhibit 1N
TERMINAL BUILDING LAYOUT 3rd FLOOR

This page intentionally left blank

Terminal Building -Penthouse Roof Plan



Lease Area Legend

A. Departure Processing
1. Ticket Counters
2. Ticket Lobby
3. Ticket Lobby Circulation
4. Security Stations

B. Arrival Processing
5. Baggage Claim
6. Claim Lobby
7. Baggage Lobby Circulation

C. Concourse Facilities
8. Passenger Holdrooms
9. Concourse Circulation

D. Airline Operations
10. Back Office / Ramp Offices
11. Baggage Outbound
12. Unenclosed Storage

E. Public Spaces
13. Restrooms
14. Concessions
15. Concessions Exterior Storage
16. Rental Car
17. Airport Administration/Aviation Dept
18. Aviation Dept Circulation
19. Federal Inspection Services (FIS)

F. Building Systems/ Support
20. General Circulation
21. Mechanical / Electrical
22. Vertical Circulation/ Stairwell
23. Storage
24. Tug Drive

G. Unclassified/ Vacant
25. Unclassified / vacant Areas

1

2

This page intentionally left blank

TERMINAL BUILDING SYSTEMS

HVAC Systems

The air conditioning system is a piped hot and cold-water system. There are four gas-fired boilers, two 300 HP units and two 125 HP units, to supply the required hot water. There are three large chillers each with a 700-ton capacity which, when combined, provide efficient energy use. The boilers, chillers, and other mechanical equipment rooms are located on Level 1 in a line along the south side of the baggage tunnel. The cooling towers for the chillers are located on the apron, sandwiched between tug drives southwest of the ticketing area. Air handling equipment is located in 20 rooftop mechanical penthouses over the main portion of the terminal building and the A and B Concourses.

Electrical Systems

The major electrical substation and transformers are located to the south of the commuter gates on the E Concourse. Power is distributed to six power centers which, in turn, feed the terminal. The supplier of electric power to the terminal has sufficient redundancy with three alternate sources.

Emergency Electrical Power

There are four gas-fired emergency electrical generators. The first pair is located at apron Level 2 just to the south of the fitness center, (formerly D Concourse gates). A second pair of generators is located at apron Level 2 below Gate A4. The four generators have a combined output of 800 amps.

TERMINAL LOADING BRIDGES

As presented on **Exhibit 1Q**, there are 22 aircraft gates with airport-owned loading bridges extending from the main terminal building. Concourse A has 13 gates and Concourse B has nine gates. In the A Concourse, United leases three gates and South-west leases five gates. The remaining five gates are available for lease and can be utilized for single charter flights. In the B Concourse, American and Delta each lease three gates, Alaska and JetBlue each lease one gate, and the remaining gate is un-leased.

All bridges are two or three tunnel apron drive bridges providing maximum flexibility. All bridges are equipped with ground power packs but do not have conditioned air.

There are 22 aircraft gates with airport-owned loading bridges extending from the main terminal building.

Concourse E provides for ground level commuter aircraft boarding.

TERMINAL AIRCRAFT APRON

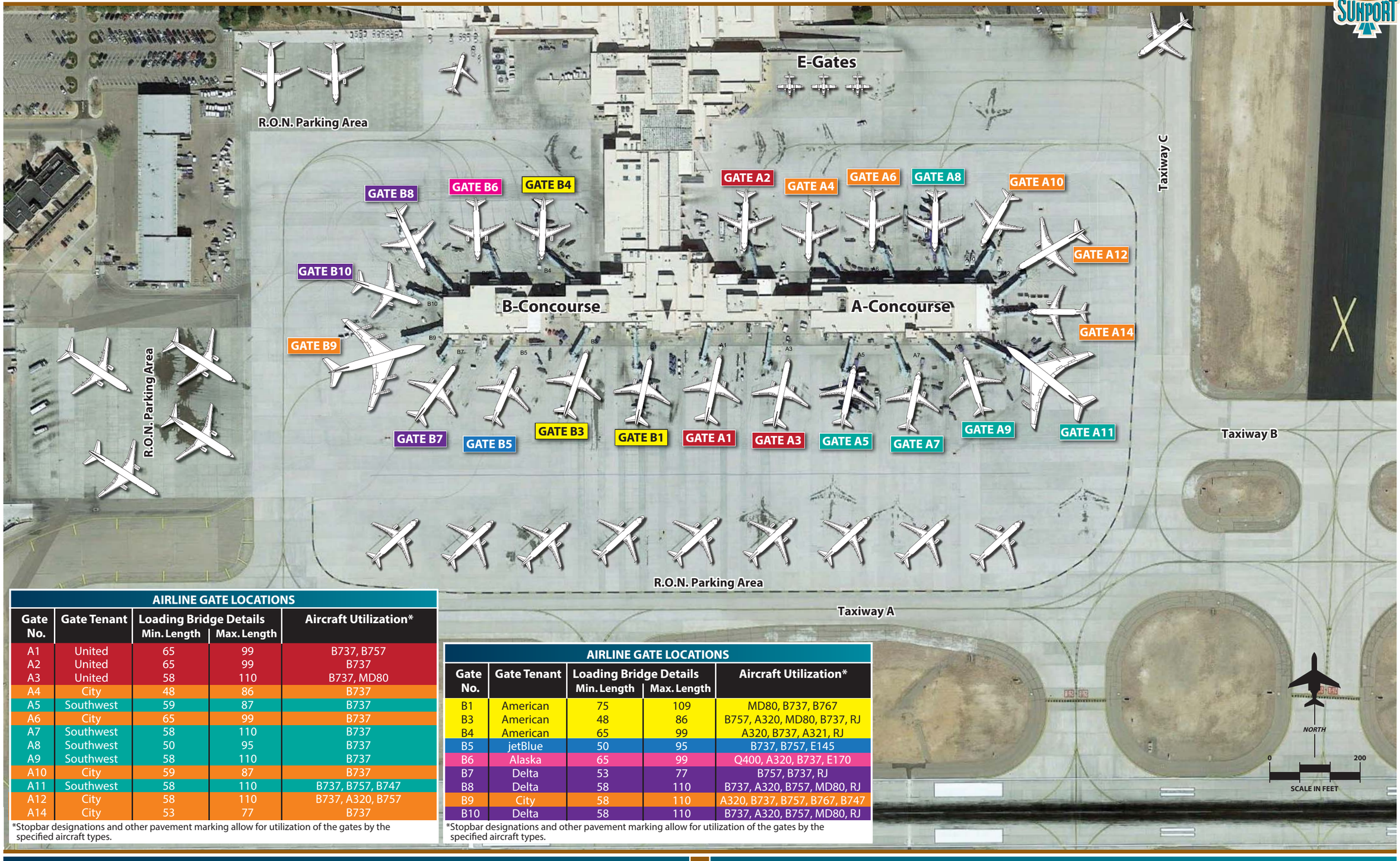
The terminal apron encompasses approximately 150,000 square yards of pavement. Two major pavement sections are connected to the terminal apron and are designated for aircraft to remain overnight (RON). There is a 40,000 square yard apron attached, located south of the main terminal apron which is marked for nine RON positions. A 20,000 square yard apron section is immediately west of the main apron with four RON positions marked. An additional 8,000 square yard apron area in the northwest corner of the main apron (former C gates) can accommodate two additional parked aircraft. Terminal gate and apron detail is presented on **Exhibit 1Q**.

TERMINAL ACCESS

Passenger terminal facilities at Albuquerque International Sunport are accessed via Sunport Boulevard, Yale Boulevard, and Girard Boulevard. Sunport Boulevard was constructed in the mid-1990s. Sunport Boulevard is a four-lane divided arterial roadway connecting to Interstate 25. A diamond interchange is located at Interstate 25 and University Boulevard. Yale Boulevard is a four-lane divided arterial. Yale Boulevard extends north from the airport across Gibson Boulevard to Central Avenue. Gibson Boulevard connects with Interstate 25. Signals are utilized at the Randolph Road and Gibson Boulevard intersections. Girard Boulevard is a two-lane connector, extending to Gibson Boulevard to the north. The Girard Boulevard/Gibson Boulevard intersection is signalized. **Exhibit 1R** shows the primary access points to the Sunport.

TERMINAL LOOP ROAD AND CURBFRONT

The 1989 expansion of the terminal area roadways extended from Yale Blvd. to provide structured elevated drives to serve the new Level 2 departure facilities and the expanded at-grade Level 1 arrivals facilities. In addition, access was provided to the parking structure and to at-grade parking within the road loop and to other perimeter parking lots. The terminal drives extend from Yale Boulevard west to an interchange at Highway I-25 and is called Sunport Boulevard. Sunport Boulevard becomes the one-way terminal loop road at Yale Boulevard. **Exhibit 1S** presents the terminal curb layout.



AIRLINE GATE LOCATIONS

Gate No.	Gate Tenant	Loading Bridge Details Min. Length	Loading Bridge Details Max. Length	Aircraft Utilization*
A1	United	65	99	B737, B757
A2	United	65	99	B737
A3	United	58	110	B737, MD80
A4	City	48	86	B737
A5	Southwest	59	87	B737
A6	City	65	99	B737
A7	Southwest	58	110	B737
A8	Southwest	50	95	B737
A9	Southwest	58	110	B737
A10	City	59	87	B737
A11	Southwest	58	110	B737, B757, B747
A12	City	58	110	B737, A320, B757
A14	City	53	77	B737

*Stopbar designations and other pavement marking allow for utilization of the gates by the specified aircraft types.

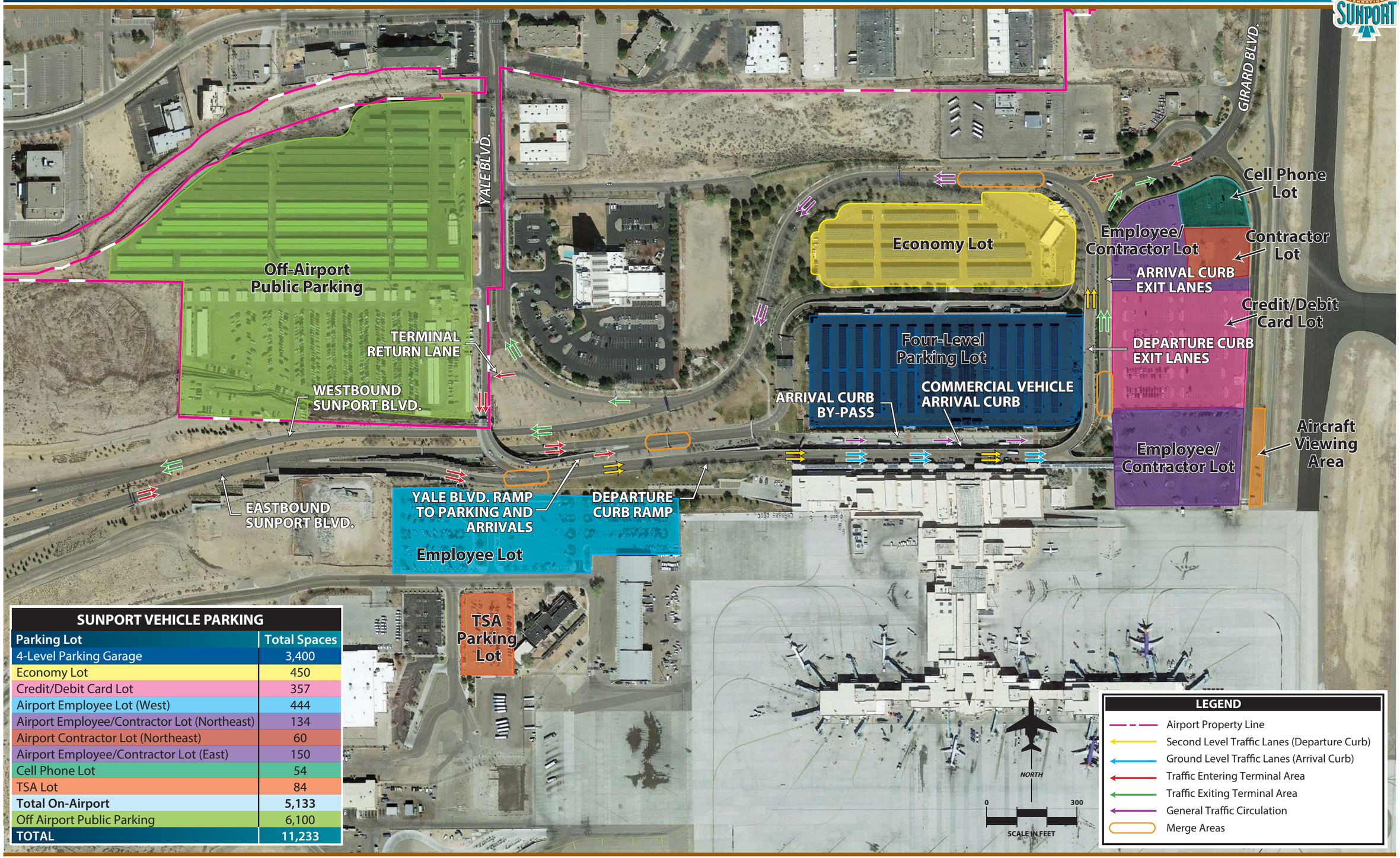
AIRLINE GATE LOCATIONS

Gate No.	Gate Tenant	Loading Bridge Details Min. Length	Loading Bridge Details Max. Length	Aircraft Utilization*
B1	American	75	109	MD80, B737, B767
B3	American	48	86	B757, A320, MD80, B737, RJ
B4	American	65	99	A320, B737, A321, RJ
B5	jetBlue	50	95	B737, B757, E145
B6	Alaska	65	99	Q400, A320, B737, E170
B7	Delta	53	77	B757, B737, RJ
B8	Delta	58	110	B737, A320, B757, MD80, RJ
B9	City	58	110	A320, B737, B757, B767, B747
B10	Delta	58	110	B737, A320, B757, MD80, RJ

*Stopbar designations and other pavement marking allow for utilization of the gates by the specified aircraft types.

Exhibit 1Q
TERMINAL GATE AND APRON DETAIL

This page intentionally left blank



SUNPORT VEHICLE PARKING	
Parking Lot	**Total Spaces**
4-Level Parking Garage	3,400
Economy Lot	450
Credit/Debit Card Lot	357
Airport Employee Lot (West)	444
Airport Employee/Contractor Lot (Northeast)	134
Airport Contractor Lot (Northeast)	60
Airport Employee/Contractor Lot (East)	150
Cell Phone Lot	54
TSA Lot	84
Total On-Airport	**5,133**
Off Airport Public Parking	6,100
TOTAL	**11,233**

LEGEND

- Airport Property Line
- Second Level Traffic Lanes (Departure Curb)
- Ground Level Traffic Lanes (Arrival Curb)
- Traffic Entering Terminal Area
- Traffic Exiting Terminal Area
- General Traffic Circulation
- Merge Areas

Exhibit 1R
ACCESS AND VEHICLE PARKING DETAIL

This page intentionally left blank

The eastbound lanes of Sunport Boulevard split west of Yale Boulevard to segregate arrival and departure traffic. Vehicles bound for the departure curb and ticketing counters (enplaning passengers) follow two lanes to the south of Sunport Boulevard to the second-level departure curb roadway which extends the length of the passenger terminal building. As shown in **Exhibit 1S**, there are three lanes on this section of the roadway, including two through lanes and one over-sized curb lane for passenger unloading. The departure curb is approximately 630 feet in length.

Vehicles approaching the terminal building from the west on Sunport Boulevard bound for the arrivals curb for passenger pick-up follow two lanes of Sunport Boulevard to the lower level. Six lanes are provided along the arrival curb. Three lanes are located under the second-level departure curb roadway. These lanes are dedicated to arriving passenger pick-up. There are two through lanes and one over-sized curb lane. Designated taxi staging points, accommodating two taxis each, have been established in three locations along the arrival curb.

The two outside lanes are dedicated to commercial vehicles, which are separated from the three arrival curb lanes by a median surrounding the pylons supporting the second-level roadway. Commercial vehicles include hotel courtesy vehicles, off-site parking shuttles, rental car shuttles, buses and charter services. Access to the commercial vehicle curb is restricted by a gate. Each commercial vehicle is required by the City of Albuquerque to carry a transponder. The transponder in the commercial vehicle is used to open the gate and track the number of times a vehicle has accessed the commercial lane and the length of time the vehicle remains along the curb. Fees have been established and are charged to the commercial vehicle operators based on the data collected through this process. The northernmost lane, farthest from the terminal building, is a through lane. The arrivals curb is estimated at 660 feet in length.

At the east end of the passenger terminal, the departure lanes turn north. A ramp returns traffic to ground level and directs traffic towards the west to exit the terminal roadway system via Yale Boulevard or Sunport Boulevard. Vehicles can return to the terminal area via the terminal return lane at Yale Boulevard. Vehicles from the departure curb cannot access Girard Boulevard. Prior to turning north, authorized vehicles can enter a ground level employee/contractor parking lot via a bridge extending from the departure curb roadway.

After exiting the arrival curb, vehicles are directed along two ground level lanes to the north. Vehicles can exit the terminal area via Girard Boulevard or follow the terminal loop roadway to exit via Yale Boulevard or Sunport Boulevard. Vehicles can return to the terminal via Yale Boulevard. The Yale Boulevard Bridge across Sunport Boulevard provides access to both the arrival and departure curbs. At the bridge,

the two southbound Yale Boulevard lanes split, one lane leads to the departure curb and one lane leads to the arrivals curb.

Vehicles approaching the terminal building via either Yale Boulevard or Sunport Boulevard access the parking garage and economy lot from the roadway leading to the ground level arrivals curb. Prior to entering the arrivals curb, the road splits with the north two lanes leading to parking. To access the credit card, employee/contractor, and cell phone lots, east of the terminal building, vehicles utilize the arrivals curb through lane and turn onto Girard Boulevard after passing the terminal building.

VEHICLE PARKING

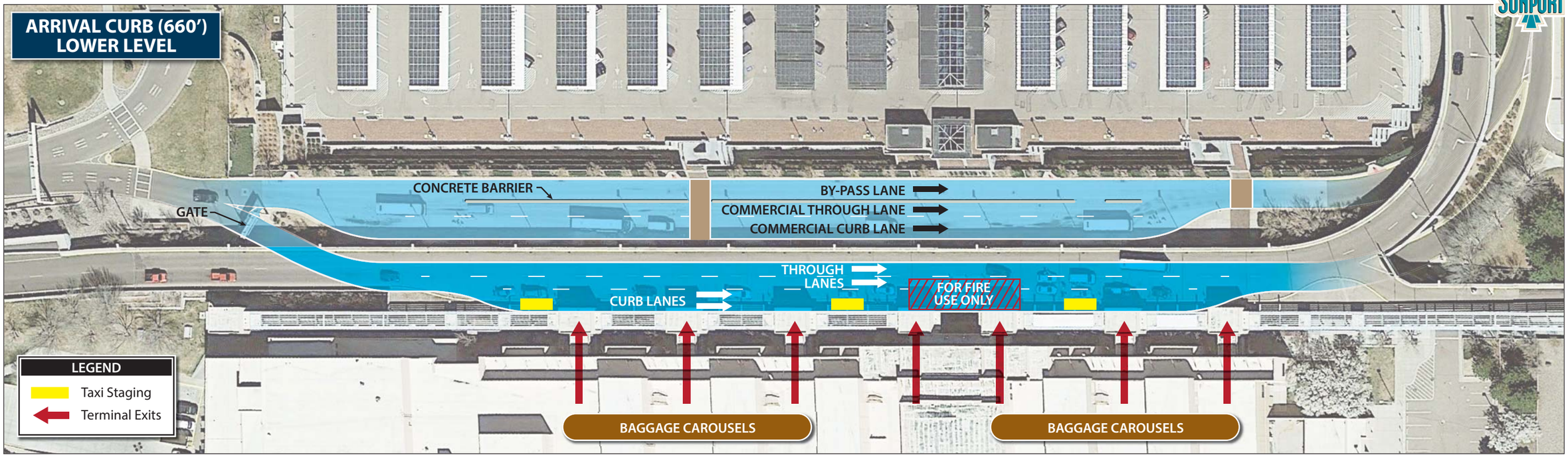
Parking facilities at Albuquerque International Sunport include areas for the public and for terminal employees as delineated on **Exhibit 1R**. A four-story parking structure with 3,400 stalls is located immediately north of the terminal building. The parking structure is connected to the terminal by a tunnel, which extends under the arrivals drive. On axis with the tunnel is a central four-story atrium that runs the width of the parking structure. The atrium space is enclosed by skylights. North of the parking structure is a 450-stall surface economy lot.

To the east of the terminal is the former rental car parking lot, which has been segregated into several designated parking areas. The credit/debit car lot provides 357 spaces. The cell phone waiting lot provides 54 spaces. The two employee/contractor lots combined provide 284 spaces. The dedicated contractor lot provides 60 spaces. Each of these parking lots is accessible via Girard Boulevard.

The primary terminal employee parking is located south of Sunport Boulevard along George Road to the west of the terminal building. There are approximately 444 parking spaces for terminal employees. The TSA parking lot is located adjacent to the original terminal building and provides 84 spaces.

There are four primary off-airport commercial parking operators. Two are located to the immediate northwest of the terminal and are accessible via Yale Boulevard. A third commercial parking lot is located at the southwest corner of Sunport Boulevard and University Boulevard. This lot is accessible from Aircraft Avenue extending from University Boulevard. The fourth commercial parking lot is at the corner of Yale and Gibson Boulevard approximately one mile from the terminal building. Each of the commercial parking lot operators provides shuttle service to and from the airport. Combined, these commercial public parking lots provide approximately 6,100 spaces. In total, it is estimated that available parking for terminal employees and the public is 11,233 spaces.

ARRIVAL CURB (660') LOWER LEVEL



DEPARTURE CURB (630') UPPER LEVEL

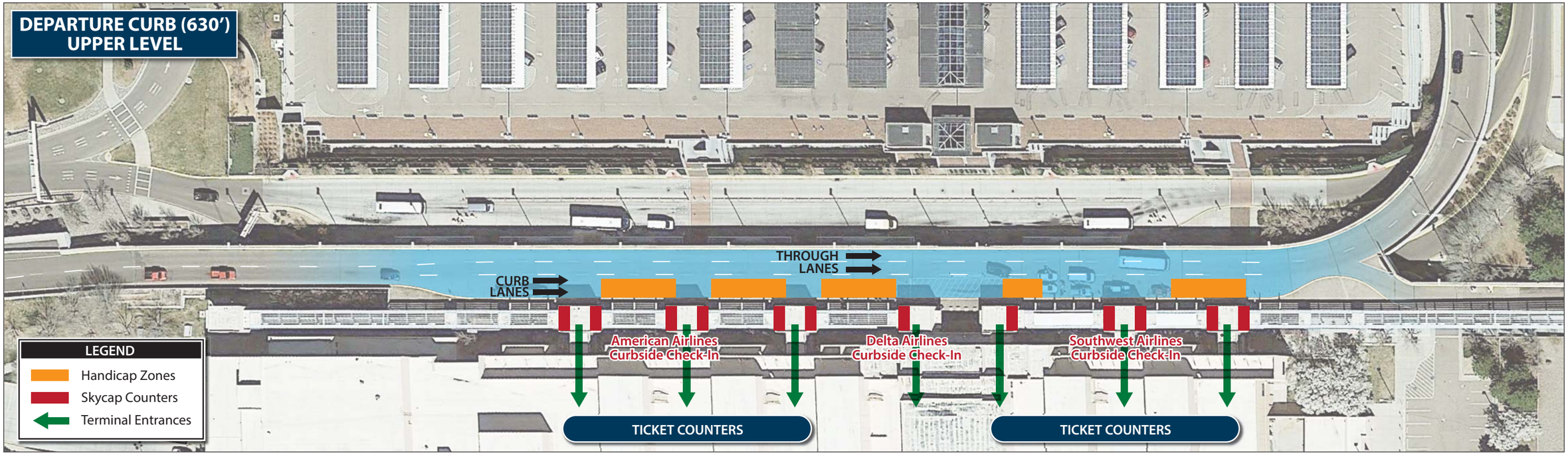


Exhibit 1S
TERMINAL CURB CONFIGURATION

This page intentionally left blank

Aircraft Viewing Area

An aircraft viewing area has been established at the south end of Girard Boulevard. There are approximately 30 vehicle parking spaces. A picnic table is available that is covered with an open-sided structure.

RENTAL CAR FACILITY

In 2004, the Sunport opened its consolidated rental car facility, which is located on University Boulevard immediately west of the Sunport. Airport-operated shuttle busses provide free transportation to and from the rental car facility. The busses drop off at the departure curb, then utilize the loop road to pick up at the arrivals curb for the short five-minute ride to the facility. Occupying approximately 55 acres of land, the facility consists of a central terminal facility, ready/return parking, and prep/service facilities and parking lots. **Exhibit 1T** shows the rental car site plan. As of January 2015, there were 10 companies providing rental car services. The rental car terminal is approximately 22,100 square feet and maintains the southwest-style architecture of the passenger terminal. The surface parking lots provide for approximately 1,200 spaces to accommodate maintenance, storage, and ready/ return functions.

TERMINAL TENANTS AND SERVICES

AVIATION DEPARTMENT

As outlined earlier, the Aviation Department of the City of Albuquerque manages and operates Albuquerque International Sunport. On Level 1, the Aviation Department occupies approximately 16,500 square feet, which includes the airport police offices. On Level 2, a total of approximately 37,100 square feet is occupied by the Aviation Department, including a pressroom and the Sunport Planning and Development offices, plus other spaces devoted to airport and airfield operations and maintenance. On Level 3, the main Aviation Department offices are adjacent to the concessions mezzanine and there are two assembly spaces on the west side behind the restaurant. These spaces total approximately 34,100 square feet. In total, the Aviation Department occupies approximately 75,100 square feet of space.

AIRLINES

Each airline leases certain space within the terminal building. This space includes the ticket counters, ticket lobby, airline offices, outbound baggage, bag claim lobby, gate positions, hold rooms, and various office and storage space. In total, airlines occupy approximately 202,300 square feet of terminal building space.

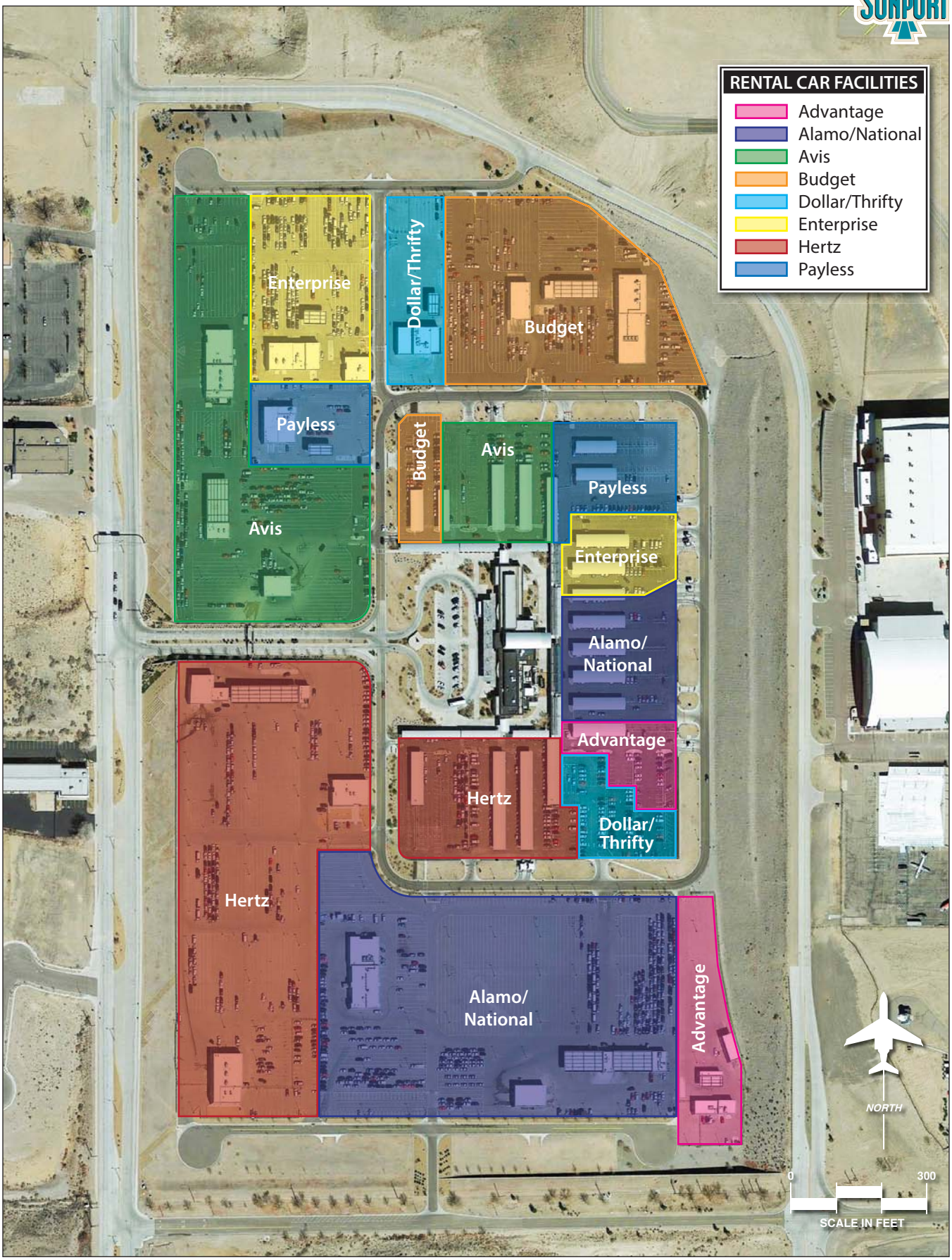


Exhibit 1T
RENTAL CAR FACILITY LAYOUT

FEDERAL INSPECTION SERVICES & SECURITY STATIONS

U.S. Customs and Border Patrol

The U.S. Customs and Border Patrol operate out of the Albuquerque International Sunport terminal on Level 2 just west of the ticketing lobby. Occupying approximately 7,600 square feet, they provide security services for all arriving international flights as well as support for border patrol operations.

TSA Passenger Security Checkpoint and Baggage Screening

The Department of Homeland Security through the TSA manages the screening of all departing passengers and their baggage at the Albuquerque International Sunport. The TSA occupies a portion of the Old Terminal Building for their administrative offices. The security checkpoint for passenger screening occupies approximately 26,700 square feet on terminal Level 3 adjacent to the crossover. It includes space for queuing, eight checkpoint stations, private screening, detention rooms, post-screening activities, staff offices, and break area. Baggage screening is provided by the TSA within each airline's outbound baggage makeup area. There is a small security station on Level 1 at the east end of the baggage claim area which occupies approximately 200 square feet. There is also a 600-square-foot security station on Level 2 adjacent to the Great Hall for commuter airline baggage screening.

CONCESSIONS

Food/Beverage: There is a variety of food and beverage services ranging from four moderately expensive, full-service restaurants, lounges and bars to five short-order food establishments. There are five snack bars with pre-packaged snacks and hot/cold beverages distributed throughout the terminal, three of which are gourmet coffee and pastry shops.

On Level 3, prior to the security checkpoints, there is a full-service restaurant and bar featuring New Mexican cuisine with ample seating and an adjacent meeting area for catered events.

There is also a gourmet coffee and pastry shop. On Level 3, after the security checkpoint, there is a food court at the confluence of the crossover and A and B concourses featuring four types of cuisine, an adjacent brew pub and grill, an ice cream shop, and other snack foods.
Tables and seating are available in the immediate area and in the observation lounge on the mezzanine above. In addition to these establishments, there is a lounge, a bar and short-order restaurant on the A Concourse, and another lounge and grill on the B Concourse.

Retail Shops: The range of retail concessionaires has been expanded to six shops and seven kiosks of various sizes. On Level 3, prior to the security checkpoint, there is a grouping of three retail shops. They include a specialty shop featuring southwestern jewelry, pottery, and other gift items, a traditional airport news shop which sells books, magazines, souvenirs, candy, etc., and a New Mexico-themed shop carrying local and regional items. On Level 3, after the security checkpoint, there is another grouping of three retail stores. They include a more traditional bookstore, and two more specialty gift shops. In addition to the larger stores, there are seven kiosks which sell a variety of books, magazines, specialty gifts, and snacks on the concourses and in the Great Hall.

The 14 food service facilities, six retail shops and seven kiosks occupy approximately 52,700 square feet, which includes approximately 1,700 square feet of storage space on Level 2 below the A and B Concourses. **Table 1F** summarizes the available concessions as of January 2015.

TABLE 1F
Food and Retail Shops
Albuquerque International Sunport

Food and Beverage	Retail Shops
Pre Security	
Black Mesa Coffee/Bakery	Hudson News
Tia Juanitas New Mexican Food	Sundancer Trading Co.
-	Greetings from NM
Post Security - Food Court Area	
Panda Express	Earth Spirit
Tia Juanitas Pronto	Thunderbird Curio
Comida Buena	Hudson Booksellers
La Trattoria	-
Ria Grande Brew Pub & Grill	-
Keva Juice	-
Post Security - A Concourse	
Quiznos Sandwich Shop	ABQ 2 Go
Route 66 Lounge	Hudson News
Black Mesa Coffee/Bakery	ABQ Style
Post Security - B Concourse	
Snack Attack	Sunport Boutique
Baskins Robins Ice Cream	Hudson News
Watch! Sports Lounge and Grill	-

Source: Sunport Administration

GROUND TRANSPORTATION

Regional shuttle van information and tickets are available on Level 1, just east of the escalator lobby. The regional shuttle loading area is located to the east of the terminal within a controlled parking lot.

Arrival passengers and visitors access city buses, rental car shuttles, off-site parking lot shuttles, and hotel shuttles from the separate commercial lanes adjacent to the private vehicle and taxi lanes at the Level 1 driveway. There are no rental car counters within the terminal building.

PUBLIC SPACES AND CIRCULATION

Public general circulation spaces consist of the parking tunnel, lobby and baggage claim avenues on Level 1; the Great Hall, ticketing, and Concourse E avenues on Level 2; and the Level 3 lobby, crossover, A and B Concourse streets, and the Observation Lounge which together total approximately 132,000 square feet of floor area.

PUBLIC SERVICE CONCESSIONS

There are ATM machines strategically located throughout the terminal, including the Great Hall, Level 3 Lobby, and several on the A and B Concourses.

Public telephones are more than adequate and are generally located along circulation paths on all three levels and adjacent to building exit/entrance points. In addition, both accessible and paging telephones are provided throughout the terminal. Special hotel and rental car telephone are located on Level 1 within the baggage lobby circulation spaces.

The Aviation Department provides wireless connectivity throughout the terminal free of charge. In addition, there are free charging stations available in the passenger hold rooms.

Defibrillators are strategically located on all three levels of the terminal building.

Vended luggage carts are also available to assist passengers with transporting baggage around the terminal.

PUBLIC RESTROOMS

As stated earlier, the public restrooms throughout the terminal have been completely remodeled with new fixtures, finishes, and accessories, and, in many cases, expanded over the past 10 years. Each restroom group appears to be adequately sized, includes a family restroom, and is easily accessed with a maximum travel distance between them of 250 feet.

On Level 1, the restrooms are centered and to the south of the escalators within the lobby. These restrooms are somewhat remote from the farthest active baggage claim area at the east end. There is a second restroom group at the west end of the terminal that is readily available but beyond the active passenger areas of the terminal.

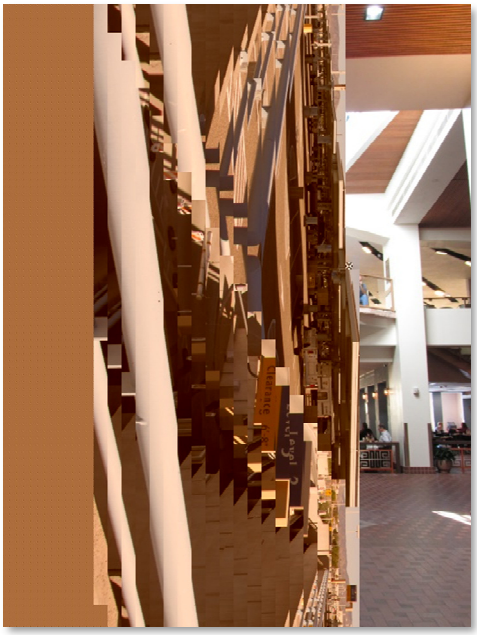
On Level 2, there is a restroom group at the west end of the ticket avenue and another group at the southeast corner of the Great Hall leading to the E Concourse gates.

Most of the public restrooms are on Level 3. There are two restroom groups off the Level 3 Lobby, three groups serving the A Concourse, and two groups serving the B Concourse.

In addition, there are common restroom groups within restricted areas for airline, concessions, TSA, and Aviation Department use. Three groups are accessible from the Level 2 apron, one group is in the Security Checkpoint office suite, and one group is located at the Planning & Development Offices. The total area occupied by public restrooms is approximately 25,500 square feet.

AMENITIES

Art Program: The airport's art program currently maintains a 113-piece permanent art collection assembled by the City of Albuquerque's Public Art Program, established in 1988. The collection represents the finest in artwork from over 70 New Mexican artists. Artwork can be found within the A and B Concourses, at the E Concourse gates, within the Great Hall, at the Baggage Claim areas, and directly outside of the ticketing level.



Entertainment: In 1998, the Sunport Arts Program expanded to include a year-round series of concerts in the Great Hall. The Sunport Serenades features an array of local talent ranging from classical, to mariachi, to jazz and polka. Each year, over 85 concerts free to the public are produced to welcome visitors to the area.

The Meditation Room: The Meditation Room is located on Level 1, on the west side of the baggage lobby circulation area. It provides the busy traveler with a place to collect his/her thoughts and to get away from the hustle and bustle of the airport.

The Sandia Vista Room: Located at the west end of Level 2 of the terminal building, the Sandia Vista Room is a leasable meeting space. The room has a kitchenette, large meeting table, modern audio-visual equipment, and projection screen. The space is architecturally designed in the southwest motif.

Observation Lounge: The Observation Lounge is located on a mezzanine accessible from Level 3 at the confluence of the crossover with the A and B Concourses. With floor to ceiling windows, the lounge provides passengers with an unobstructed view to the airfield activities.

Public Information: The public information counters are located on Level 1, immediately west of the escalators in the baggage lobby circulation area. The individuals that work at the counters provide invaluable information about hotels, car rentals, sightseeing, etc. The counter is staffed by the Greater Albuquerque Chamber of Commerce.

Sunport Ambassadors: The Sunport has initiated a successful program to aid the travelling public. The Sunport Ambassadors are volunteers who meet and greet travelers with welcoming smiles and direct them to flight gates, bag claim, ground transportation, and other airport facilities. The Ambassador program has more than 30 volunteers who represent what is great about the community.

Cavalcade of Wings: The Cavalcade of Wings is a permanent public display of hundreds of model aircraft. The display is adjacent to the ticketing area and the Great Hall.

LANDSIDE FACILITIES

Landside facilities are those airport elements that are not directly related to the airfield system. Landside elements include the terminal complex (previously discussed), general aviation and air cargo facilities, support facilities, such as fuel storage, airport maintenance, and aircraft rescue and firefighting. **Exhibit 1U** presents an overview of the various landside facilities at the Sunport.

TERMINAL AREA FACILITIES

The area to the immediate west of the terminal building and apron is primarily dedicated to support services for the main terminal complex. Much of this area is constructed on a former landfill and subsidence is common throughout. New construction requires significant earthwork to ensure structural integrity. Access to the west terminal area is via George Road, which extends east from University Boulevard. **Exhibit 1V** identifies the location of the facilities and buildings in the west terminal area, as well as those facilities located north of the terminal building.

Historic Old Terminal Building (TSA Offices): The historic original terminal building was constructed in 1939 and utilized as the primary terminal until 1965 when the replacement terminal was opened. The building was added to the National Register of Historic Places in 1989. In 1997, the building was restored and all post-1945 additions were removed. The facility is approximately 28,900 square feet (sf) of floor space.

The Transportation Security Administration (TSA) leases space in the facility occupying the basement, second floor, and most of the first floor. By agreement with the City of Albuquerque, the Great Hall, a meeting space, and restrooms on the first floor are open to the public.

Freight Facility: The freight facility, immediately adjacent to the terminal apron, is used primarily to process air freight carried by scheduled passenger airlines. The building encompasses approximately

29,700 sf of space. As dedicated all cargo airlines (e.g., FedEx, UPS) have grown, the demand for airlines to carry freight has diminished. As a result, much of the facility is not leased to the airlines, while other space is leased for non-aviation uses. Other unleased space is utilized by airport maintenance.

Previous planning for the Sunport has included removal of the freight facility in order to make room for extension of Concourse B.

Provisioning Facility: The provisioning building is a prefabricated steel building constructed in the late 1980s. The facility encompasses approximately 10,600 sf of space. Most of the facility is utilized by Southwest Airlines. The provisioning building is on the secure side of the airport.

Aircraft De-icing Facility: De-icing is necessary to ensure the safety of aircraft when operating in cold or freezing conditions. Aircraft Service International Group (SIG) manages three (3) 12,000 gallon tanks of de-icing fluid which are located on the west terminal ramp. Two of the tanks store Type I Propylene Glycol and the third is for Type IV Propylene Glycol. Each airline contracts individually with ASIG for de-icing services.

Operationally, each aircraft will push back from the gate where ASIG will de-ice the aircraft, as long as they are clear of all the storm drains. The aircraft will then proceed to the runway for takeoff. The aviation department's airfield maintenance crew uses a sweeper to collect the spent de-icing fluid from the ramp and disposes of it at the triturator station, where the airlines dump lavatory waste.

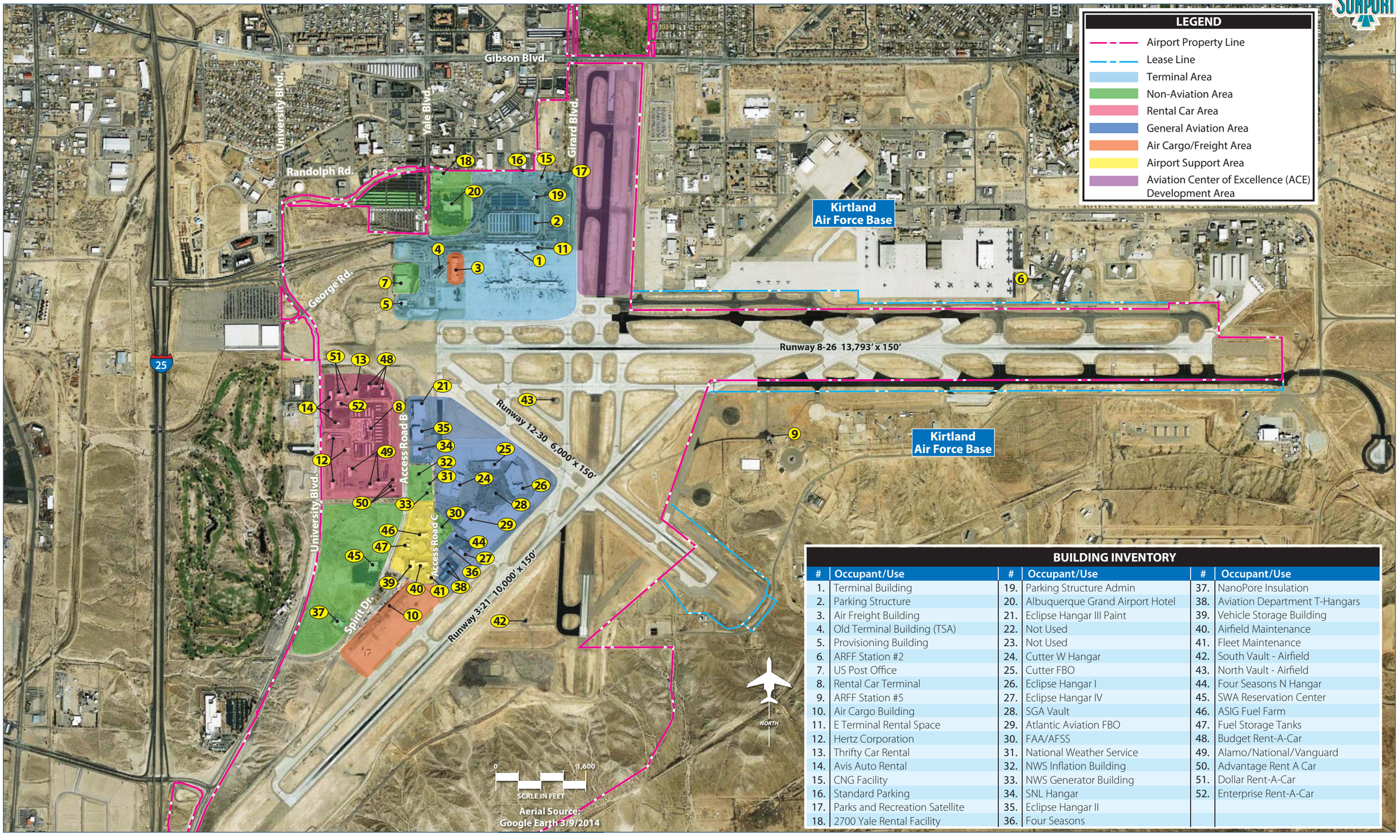
Remote Fueling Station: Fueling of commercial aircraft at the Sunport is from tanker trucks that pull alongside aircraft as they are parked at the terminal gate. The tanker trucks are refilled primarily at the remote fueling station. Fuel is delivered to the remote fueling station via underground piping leading from the large fuel storage tanks located in the southwest quadrant of the Sunport.

Triturator Station, Pathogen Destructor, Waste Collection Station: Aircraft lavatory waste is disposed of at the triturator station which connects to the City of Albuquerque's sanitary sewer system. The pathogen destructor is used to destroy waste from international flights. The waste collection station is a compacting waste dumpster.

Wash Station: The wash station is an open canopy structure with a floor drain. This facility is primarily used to wash ground support equipment. This facility drains to the City's sanitary sewer system.

Terminal Loading Dock: The terminal loading docks are located at the far west end of the terminal building. Vendors making deliveries to businesses within the terminal building utilize this loading and unloading location.

North Service Facilities: There are three support facilities located just north of the economy parking lot which are accessible via Girard Boulevard. The Standard Parking facility is where the rental car shuttle buses are serviced. The compressed natural gas (CNG) facility is where City vehicles that operate on natural gas are fueled. The Department of Parks and Recreation has a satellite facility in this location as well.



BUILDING INVENTORY

#	Occupant/Use	#	Occupant/Use	#	Occupant/Use
1.	Terminal Building	19.	Parking Structure Admin	37.	NanoPore Insulation
2.	Parking Structure	20.	Albuquerque Grand Airport Hotel	38.	Aviation Department T-Hangars
3.	Air Freight Building	21.	Eclipse Hangar III Paint	39.	Vehicle Storage Building
4.	Old Terminal Building (TSA)	22.	Not Used	40.	Airfield Maintenance
5.	Provisioning Building	23.	Not Used	41.	Fleet Maintenance
6.	ARFF Station #2	24.	Cutter W Hangar	42.	South Vault - Airfield
7.	US Post Office	25.	Cutter FBO	43.	North Vault - Airfield
8.	Rental Car Terminal	26.	Eclipse Hangar I	44.	Four Seasons N Hangar
9.	ARFF Station #5	27.	Eclipse Hangar IV	45.	SWA Reservation Center
10.	Air Cargo Building	28.	SGA Vault	46.	ASIG Fuel Farm
11.	E Terminal Rental Space	29.	Atlantic Aviation FBO	47.	Fuel Storage Tanks
12.	Hertz Corporation	30.	FAA/AFSS	48.	Budget Rent-A-Car
13.	Thrifty Car Rental	31.	National Weather Service	49.	Alamo/National/Vanguard
14.	Avis Auto Rental	32.	NWS Inflation Building	50.	Advantage Rent A Car
15.	CNG Facility	33.	NWS Generator Building	51.	Dollar Rent-A-Car
16.	Standard Parking	34.	SNL Hangar	52.	Enterprise Rent-A-Car
17.	Parks and Recreation Satellite	35.	Eclipse Hangar II		
18.	2700 Yale Rental Facility	36.	Four Seasons		

This page intentionally left blank

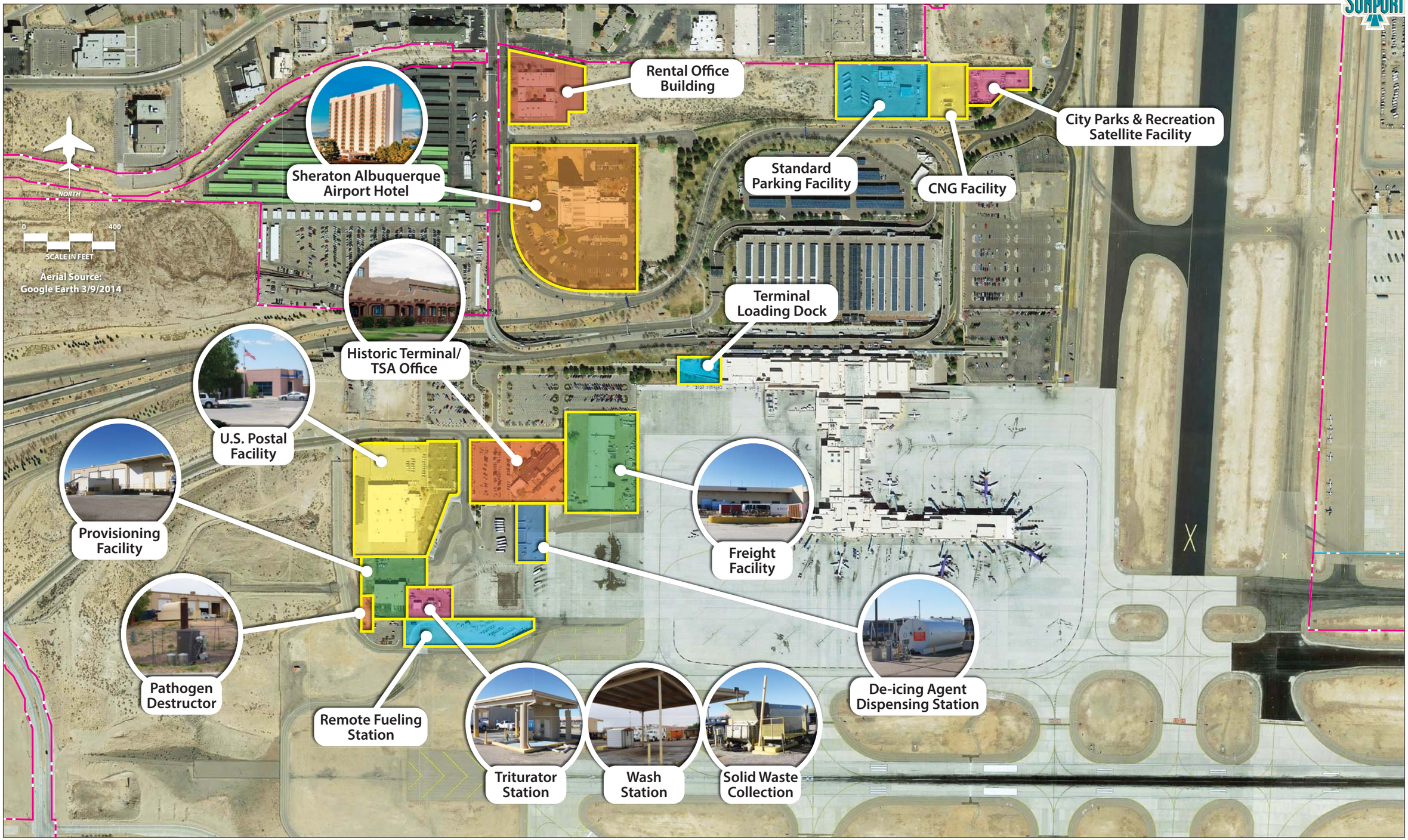


Exhibit 1V
TERMINAL AREA FACILITIES

This page intentionally left blank

Hotel: The Sheraton Albuquerque Airport Hotel is located to the northwest of the terminal building on the north side of Sunport Boulevard. The hotel is within walking distance of the Sunport terminal. The 14-story tall hotel features 276 rooms and is approximately 525,000 sf in size. The owner of the building is VWI Albuquerque LLC and Easley, McCaleb and Associates, and the Aviation Department owns the land.

U.S. Postal Facility: The U.S. Postal Service maintains a facility in this location. The role of this facility has diminished greatly as air mail is not flown out of this facility. The facility is approximately 49,800 sf and there are approximately 48 parking spaces. The Aviation Department owns the land and the U.S. Postal Service owns the building.

Rental Office Building (2700 Yale Boulevard SE): This office building is owned by the Aviation Department which offers lease space for non-aviation tenants. This single-story building encompasses approximately 24,600 sf of space. This property is located in the northwest corner of the Sunport property, on the east side of Yale Boulevard just north of Sunport Court and north of the Sheraton Albuquerque Airport Hotel. A local business that provides technical consultation to its clients is located on the property. Property just east of this lot is vacant.

SOUTHWEST AREA FACILITIES

The development in the southwest area of the Sunport includes the primary general aviation facilities, air cargo operations, airport maintenance facilities and other support facilities, as well as several non-aviation uses. Access to the southwest area is from Spirit Drive, which loops to connect at two points with University Boulevard. **Exhibit 1W** identifies the location of these facilities.

General Aviation Hangars

Enclosed hangar space is essential to house the significant investments owners have made in aircraft. It is estimated there is 343,600 sf of hangar space at the Sunport. Of this total, approximately 25,300 sf is represented by T-hangars. The remaining 318,300 is contained in conventional and box hangars. Two hangars, the Sandia National Laboratories (SNL) hangar and the Eclipse Aerospace III hangar are not utilized for aircraft storage. The total hangar area available for aircraft storage is approximately 270,000 sf. The following discusses the general aviation hangars at the Sunport.

It is estimated there is 343,600 sf of hangar space at the Sunport.

ONE Aviation (Eclipse Aerospace Hangars): Eclipse Aerospace has merged with Kestrel Aircraft to become ONE Aviation. The Eclipse is a light jet and the Kestrel is a small single engine turboprop. The Eclipse 550 twin engine and the Kestrel 350, both of which seat up to six, are the models currently in production. ONE Aviation occupies four hangars at the Sunport. Hangar I is the main hangar and houses the headquarters office. The facility is approximately 95,500 sf of space, of which approximately 41,500 sf are hangar space. Hangar II is the main manufacturing hangar which has approximately 35,000 sf of

hangar space and an additional 14,000 sf of office space. Hangar III is the paint hangar, which has approximately 52,000 sf of hangar area and an additional 13,600 sf of office space. Hangar IV, located farther to the south near Taxiway F, has 8,200 sf of hangar space and 1,200 sf of office space.

Cutter Aviation (FBO): Cutter is one of two full service FBOs at the Sunport. The main Cutter hangar is approximately 40,000 square feet. Attached to the main hangar are the pilot service areas and business offices which are approximately 25,500 sf of space. The Cutter West hangar is approximately 53,600 sf with an additional 3,600 sf of space for offices.

Atlantic Aviation (FBO): Atlantic Aviation is the other full service FBO at the Sunport. The main Atlantic hangar is approximately 50,500 sf in size. Their offices and pilot function area encompass an additional 17,000 sf of space.

Four Seasons Hangars: There are two hangars occupied by Four Seasons Aviation. One is approximately 10,200 sf and the other is approximately 6,300 sf.

Sunport T-Hangars: The Aviation Department owns and leases space in two T-hangar units. The larger structure is approximately 16,200 sf with 10 units and the smaller is 9,100 sf with six units.

General Aviation Apron Area

Apron space is essential to accommodate both transient general aviation aircraft, as well as a portion of locally based aircraft that are stored utilizing an aircraft tie-down position. In total, there are approximately 131,900 square yards of apron pavement available.

In 2011, the Sunport completed a project to reconstruct two portions of the FBO apron areas to provide additional strength so that larger and heavier general aviation aircraft could be accommodated. The heavy load apron pavements are approximately 5,000 sy and are situated in front of each FBO. Restrictions are in place for the use of the heavy load apron in order to preserve its useful life. Currently, heavy aircraft can be parked on the heavy load pavement a limited number of times based upon a formula accounting for aircraft weight and use repetitions.

Even with this improved apron, the largest aircraft that might utilize the FBO aprons are unable to do so. In agreement with the ATCT and the Sunport administration, that portion of Taxiway K between Taxiways E1 and G1, which has higher pavement strength, is closed and used to park these aircraft.

GENERAL AVIATION HANGARS

	Hangar Tenant	Hangar Space (sf)	Other Space (sf)	Total Space (sf)	Total Usable GA Space (sf)
26	Eclipse I Hangar	41,500	55,000	96,500	96,500
25	Cutter Main Hangar	40,000	25,600	65,600	65,600
24	Cutter West Hangar	52,900	3,600	56,500	56,500
29	Atlantic Hangar	50,000	15,400	65,400	65,400
21	Eclipse III Hangar	52,000	13,600	65,600	0
35	Eclipse II Hangar	36,000	14,000	50,000	50,000
34	SNL Hangar	21,600	4,400	26,000	0
44	Four Seasons North Hangar	6,300	0	6,300	6,300
36	Four Season Hangar	10,000	0	10,000	10,000
27	Eclipse IV Hangar	8,000	1,200	9,200	9,200
38a	Sunport T-Hangars	9,100	0	9,100	9,100
38b	Sunport T-Hangars	16,200	0	16,200	16,200
	TOTAL	**343,600**	**132,800**	**476,400**	**384,800**

GENERAL AVIATION APRON

ID#	Apron Space (sy)
A	18,700
B	24,800
C	2,500
D	14,700
E	8,200
F	40,900
G	11,600
H	2,700
J	6,400
K	1,400
Total	**131,900**

OTHER SOUTHWEST AREA FACILITIES

ID#	Building Description	Area
	AIR CARGO	
10	Air Cargo Sort Facility	52,000 sf
10a	Air Cargo Apron	89,700 sy
	AIRPORT SUPPORT FACILITIES	
46	ASIG Fuel Farm	12,800 sf
39	Maintenance Vehicle Storage	14,000 sf
40	Airfield Maintenance	13,100 sf
41	Fleet Maintenance Building	2,500 sf
	OTHER FACILITIES	
31	NWS Offices	6,600 sf
32	NWS Baloon Inflation Station	300 sf
53	NMDOT-Aviation Division	1,700 sf
30	FAA/AFSS	12,500 sf
45	Southwest Airlines Call Center	23,800 sf
37	NanoPore Insulation	17,600 sf

LEGEND

- Airport Property Line
- General Aviation Area
- Air Cargo/Freight Area
- Airport Support Area
- Other Facilities

Exhibit 1W
SOUTHWEST AREA FACILITIES

This page intentionally left blank

Air Cargo

Dedicated air cargo operators utilize the facilities which are located in the far southwest portion of the Sunport. In this area is a cargo building encompassing approximately 52,000 sf. The aircraft apron serving the sort facility is approximately 89,700 sy. Ground servicing equipment (GSE) used by the all-cargo airlines to load and unload air freight from aircraft is stored outside along the northwest portions of the apron. The cargo carriers utilizing the facility as of January 2015 were FedEx, UPS, 10 Tanker Air Carrier, and Matheson Flight Extenders, Inc. Empire Airlines, Ameriflight, South Aero, and Kalitta Charters are additional air cargo carriers that utilize the general aviation apron areas.

Other Facilities

There are several facilities located on the southwest side of the Sunport. Many have aviation-related functions, but do not necessarily require aviation access to the runway and taxiway system.

FAA/AANC NDI Validation Center (SNL Hangar): In 1991, the Federal Aviation Administration (FAA) established an Airworthiness Assurance NDI Validation Center (AANC) at SNL. Its primary mission is to support technology development, validation, and transfer to industry in order to enhance the airworthiness and improve the aircraft maintenance practices of the U.S. commercial aviation industry. The Center conducts projects in a myriad of engineering disciplines. The results are placed in the public domain so that the industry at-large can reap the benefits of FAA-funded Research and Development efforts. To support the Center's goals, the FAA/AANC has set up a hangar facility at the Albuquerque International Sunport which contains a collection of transport and commuter aircraft as well as other test specimens. The facility replicates a working maintenance environment by incorporating both the physical inspection difficulties as well as the environmental factors which influence maintenance reliability. The SNL hangar is immediately south of the Eclipse hangar II. The hangar space is approximately 21,600 sf of space plus an additional 3,800 sf of office space.

FAA Automated Flight Service Station (AFSS): The FAA/AFSS is located on the airport and is one of five facilities serving the continental U.S., Hawaii, and the Caribbean. The AFSS is an air traffic facility that provides information and services to pilots before, during, and after flights. Unlike an air traffic control tower, the AFSS is not responsible for giving instructions, clearances, or for providing separation. Information available to pilots includes enroute communication and meteorological and aeronautical briefings, such as weather conditions and Notices to Airmen (NOTAMSs). The AFSS has primary responsibility for filing flight plans. The building is approximately 12,500 square feet.

NMDOT – Aviation Division: The New Mexico Department of Transportation – Aviation Division offices are located in a modular building west of Access Road C. The building encompasses approximately 1,700 square feet.

National Weather Service: The National Weather Service leases space at the Sunport. Their facility encompasses approximately 6,600 sf of space. Also on-site is its weather balloon inflation building which has a footprint of approximately 300 sf.

Southwest Airlines Call Center: The Southwest Airlines Call Center is a building of approximately 23,800 sf. It is located on the west side of Spirit Drive. The land and facility are owned by the Aviation Department and leased to the tenant.

NanoPore Insulation: This private company occupies a 17,600 square-foot facility located on the west side of Spirit Drive. NanoPore develops high porosity/high surface area materials for a wide range of applications, including adsorption, gas separation, advanced thermal insulation, low-K dielectrics, and optics. NanoPore leases the facility from the Aviation Department.

AIRPORT SUPPORT FACILITIES

Airport Rescue and Firefighting (ARFF)

Kirtland Air Force Base Fire Department provides ARFF services and equipment.

14 CFR Part 139 airports are required to provide aircraft rescue and firefighting (ARFF) services during air carrier operations that require a Part 139 certificate. Each certificated airport maintains equipment and personnel based on an ARFF index established according to the length of aircraft and scheduled daily flight frequency. There are five indices, A through E, with A applicable to the smallest aircraft and E the largest (based on length). Albuquerque International Sunport falls within ARFF Index C. As such, the Sunport is required to maintain a fleet of equipment and properly trained personnel consistent with this standard.

Kirtland Air Force Base Fire Department provides ARFF services and equipment in accordance with a Memorandum of Agreement dated August 24, 1984, and the deed transferring the runways to the City of Albuquerque dated March 16, 1970. The service and equipment provided by the Air Force meet standards required by military aircraft utilizing the facilities at the airport. These standards exceed the requirements of Index C of 14 CFR Part 139.

The Air Force maintains two fire stations that serve the Sunport. Station No. 2 was constructed in 2004 and is in excellent condition. It is located on Air Force property immediately north of Taxiway A, between Taxiways A9 and A10. Station No. 5 was constructed in 1956 and is in relatively poor condition. Current planning is considering replacement of this facility. Station No. 5 is located south of Taxiway E and east of Taxiway H on Air Force property.

Table 1G is an itemized list of the airport's ARFF equipment including firefighting agent capacities.

Airport Maintenance and Snow Removal

Sunport personnel handle most airport maintenance and all snow removal operations. These functions are co-located at the airport maintenance facility located in the southwest quadrant of the airport adjacent to the air cargo apron. The airport maintenance facility includes a 14,000 square-foot maintenance building, 13,100 square-foot equipment storage building, 2,500 square-foot fleet maintenance building, and paved yard for additional equipment storage and circulation. There is a dedicated snow removal equipment (SRE) building and a dedicated maintenance equipment storage building. **Table 1H** is the current SRE inventory.

TABLE 1G
Aircraft Rescue and Firefighting Equipment
Albuquerque International Sunport

Vehicle	Year	Location	Condition	Extinguishing Agents	Discharge Rate
PRIMARY RESPONSE FOR AIRCRAFT EMERGENCIES					
P-23, Crash Truck (C-11, E-1)	1995	Station 5	Excellent	3,300 gal. water 500 gal. AFFF 500 lbs. dry chemical	2,000 gal. water/minute
P-19, Crash Truck (C-16)	1985	Station 5	Excellent	1,000 gal. water 130 gal. AFFF	750 gal. water/minute
P-19, Crash Truck (C-15)	1986	Station 2	Excellent	1,000 gal. water 130 gal. AFFF	750 gal. water/minute
P-22, Structural Pumper (E-25)	1996	Station 2	Excellent	750 gal. water 30 gal. AFFF 30 gal. Class A Foam	1,250 gal. water/minute
P-26, Heavy Rescue (R-4)	1998	Station 2	Excellent	NA	NA
ADDITIONAL EQUIPMENT AVAILABLE THROUGH KIRTLAND AIR FORCE BASE					
P-18, Water Tanker (T-9)	1987	Station 1	Excellent	2,000 gal. water	500 gal. water/minute
P-23, Crash Truck (C-10)	1995	Station 2	Excellent	3,300 gal. water 500 gal. AFFF 500 lbs. dry chemical	2,000 gal. water/minute
P-23, Crash Truck (C-12)	1995	Station 2	Excellent	3,300 Gal. water 500 Gal. AFFF 500 lbs. dry chemical	2,000 gal. water/minute
P-19, Crash Truck (C-14)	1985	Aux Field	Excellent	1,000 gal. water 130 gal. AFFF	750 gal. water/minute
P-24, Structural Pumper (E-22)	1994	Station 1	Excellent	750 gal. water 30 gal. AFFF 30 gal. Class A Foam	1,250 gal. water/minute
P-24, Structural Pumper (E-23)	1994	Station 3	Excellent	750 gal. water 30 gal. AFFF 30 gal. Class A Foam	1,250 gal. water/minute
P-18, Tanker Truck (T-8)	1987	Station 3	Excellent	2,000 gal. water	500 gal. water/minute
P-26, Tanker Truck (T-7)	1993	Station 2	Excellent	5,000 gal. water	1,000 gal. water/minute
Ford Mini-pumper Wildland	2004	Station 2	Excellent	250 gal. water	500 gal. water/minute
Ladder 5 Aerial	1999	Off-Airport	Excellent	300 gal. water	2,000 gal. water/minute
P-20 Medium Rescue (R-3)	2000	Station 1	Excellent	NA	NA

Source: Airport Certification Manual; Airport staff

TABLE 1H
Snow Removal Equipment
Albuquerque International Sunport

Vehicle	Equipment
Snowplow/Broom 1	20' Broom/Blade
Snowplow/Broom 2	20' Broom/Blade
Snowplow 3	20' Blade
Snowplow 4	20' Blade
Snowplow 5	11' Blade
Blower 6	Blower/14' Broom
Blower 15	Blower/Loader
Pick-up 7	7.5' Blade/Spreader
Pick-up 8	7.5' Blade/Spreader
Truck 16	De-icer
Truck 11	10' Blade
Truck 12	10' Blade
Truck 14	10' Blade/Spreader
Pick-up 9	7.5' Blade/Spreader
Pick-up 10	7.5' Blade/Spreader

Source: Airport Certification Manual

Fuel Storage

Under revised 14 CFR Part 139.321, *Handling and Storing of Hazardous Substances and Materials*, the FAA has clarified the airport operator's responsibility for fuel storage areas owned or operated by tenant air carriers. Specifically, the FAA has deleted paragraph (h), which exempted the airport operator from overseeing Part 121 or 135 air carrier fueling operations to ensure compliance with Part 139 fuel fire safety requirements. Accordingly, the FAA holds airport operators responsible for protecting against fire and explosion in air carrier fuel storage facilities. This will ensure that all fuel storage facilities at Part 139 airports are inspected in the same manner and held to the same fuel fire safety standards.

A wide range of fuel types are stored on the airport in tanks ranging from small personal containers to large bulk storage tanks. The significant facilities are listed in **Table 1J**.

TABLE 1J
Fuel Storage Capacity (gallons)
Albuquerque International Sunport

	Jet A		100LL		Unleaded		Diesel	
	Static	Truck	Static	Truck	Static	Truck	Static	Truck
Atlantic Aviation	45,000	10,000	15,000	1,000	-	-	-	-
Cutter Aviation	60,000	14,400	20,000	4,700	500	-	500	-
Swissport	-	62,000	-	-	-	1,800	-	1,000
ASIG	1,200,000	-	-	-	10,000	500	10,000	500
TOTAL	1,305,000	86,400	35,000	5,700	10,500	2,300	10,500	1,500
TOTAL Jet A	1,391,400							
TOTAL 100LL	40,700							
TOTAL Unleaded	12,800							
TOTAL Diesel	12,000							

ASIG: Aircraft Service International Group
Source: Airport records

The most prominent of the fuel storage facilities is that owned and operated by ASIG. They have three large aboveground tanks with a combined capacity of 1.2 million gallons. Underground piping from these tanks leads to the remote fueling station located in the terminal area. The ASIG facility is accessible via Access Road C. The office building at the facility encompasses approximately 12,800 sf.

In addition to the storage capacity above, there is a fuel station in the airport maintenance yard located in the southwest area of the Sunport. There are two fuel pumps, one each for Unleaded and Diesel. Each pump has two hose nozzles. The pumps are supplied by underground tanks, both with a 6,000-gallon capacity. The City of Albuquerque (City Fleet) maintains the pumps and tanks including annual inspections and fuel deliveries. The Aviation Department is then billed for fuel used.

Security Fencing

The airport operations area (AOA) and other areas required to be secure on the airport property are enclosed with security fencing topped with three strands of barbed/razor wire.

UTILITIES

Albuquerque International Sunport is served by electrical, sewer, water, and natural gas services. The following provides a summary of these systems at Albuquerque International Sunport. **Exhibit 1Y** presents the primary utility lines at the Sunport.

Water: The City of Albuquerque supplies the Sunport with potable water. The terminal apron is served by three water mains. A 14-inch main enters the apron area from the north on Girard Blvd. An 8-inch line enters near the east end of the parking facility, and a 12-inch main enters the apron area from the west near the Historic Old Terminal Building. These lines are interconnected and are fed through mains located in Girard Blvd. and Yale Ave.

The general aviation area and consolidated rental car facility are served by a 14-inch waterline installed in University Blvd. and a 20-inch water main that crosses the west end of the airfield. The 20-inch main crosses the airfield off the end of Runway 8, through the General Aviation Area and Air Cargo Freight Facility. These lines are interconnected.

Sanitary Sewer: The City of Albuquerque owns the sanitary sewer system that collects wastewater from Albuquerque International Sunport. The collection system enters the terminal area from two locations: an 8-inch main east of the facility and an 8-inch main on the west end of the facility. Both of these lines connect to a 12-inch main that runs to the north in Yale Blvd. The triturator (dump station for airline waste) is located near the west side of the ramp area. The triturator discharge is collected in the Yale Blvd. main.

The general aviation area and the consolidated rental car facility are served by an 8-inch sanitary sewer main located in University Blvd. and Clark Carr Blvd. This line crosses the University of New Mexico Golf Course to the west.

An 8-inch sewer line serves the property adjacent to the southern portion of Spirit Drive. The Clark Carr/University sewer lines serve the northern portion of Spirit Drive, including the Air Cargo Freight Facility and Southwest Airlines Reservation Facility.

Storm Sewer: The Sunport has an extensive storm sewer system that drains over 2,200 acres. The storm sewer system divides the airport and a portion of Kirtland Air Force Base into drainage basins that drain to outfalls to the Tijeras Arroyo to the south and the South Diversion Channel to the west. The areas located east of former Runway 17-35 and north of Taxiway E flow to three outfalls located on Kirtland Air Force Base (KAFB) property. The drainage basins located within KAFB north of Taxiway A also flow to these outfalls. A large detention basin, 85-acre-ft. capacity, is located on the largest outfall to lower the peak flow into the arroyos feeding the Tijeras Arroyo.

The basins south of Taxiway E flow either to an outfall located south of the MIT site or to the west to an outfall through the UNM Golf Course. The southern outfalls lead to the Tijeras Arroyo, while the west outfalls lead to the Southern Diversion Channel.

The areas north of Taxiway E and east of former Runway 17-35, all drain to storm drain pipes leading to outfalls to the South Diversion Channel. Most notable of the outfalls from these basins are the systems that drain to the west terminal apron and western portion of the airfield, the east portion of the terminal apron, former Runway 17-35, and the landside area of the terminal building and parking structure. Two major outfalls serve these systems. One exits the airfield off the end of Runway 8 and crosses I-25 near the Sunport Interchange. The second system exits airport property north of the terminal loop road to Yale Blvd. and eventually to the Kirtland Channel.

Additionally, a storm drainage system was constructed with Sunport Blvd. This system drains the area in front of the terminal and Sunport Blvd. This system discharges under I-25 adjacent to the system that comes from the west end of the airfield.

The City of Albuquerque Public Works Department and Aviation Department maintain the storm drain system located on City or Airport property. The Tijeras Arroyo and the South Diversion Channel maintenance are the responsibility of the Albuquerque Metropolitan Arroyo and Flood Control Authority (AMAFCA). Kirtland Air Force Base is responsible for maintenance of the storm drain systems on Air Force property.

Electrical Power: The Public Service Company of New Mexico provides electrical service to the Sunport through two distribution substations identified as Substation #1 and Substation #2. Electrical service to the terminal building is supplied from Substation #1 via two distribution feeders identified as Feeder 11 and Feeder 12. Electrical service to the airfield is supplied from Substation #1 via distribution Feeder 13 and Substation #2 via distribution Feeder 21.

The airfield has two electrical control vaults, one fed from Feeder 13 and the other feed from Feeder 21. The terminal building has back-up generators that automatically switch online for an outage of Feeder 11 and Feeder 12. The parking structure is fed from an emergency generator located near the toll booths and the terminal building is fed from two generators located adjacent to the operations office.

For an individual outage of one of the feeders serving the terminal building (Feeder 11 or Feeder 12) PNM can transfer the out of service feeder to the remaining in-service feeder via a pole-mounted switch located west of the airport. The airfield has backup utility feeds through automatic transfer switches located at the North and South Electrical Vaults. Feeder 21 serves as the primary source for the South Electrical Vault and Feeder 13 serves as the primary source for the North Electrical Vault. For an outage of any one of the distribution feeders serving the airfield electrical vaults, the automatic transfer switch will bring the other distribution feeder on-line. If both PNM feeds fail, emergency generators located at each vault will come online and will provide power for the runway and taxiway lights and the FAA navaids on Runways 8-26 and 3-21.

The control of the airfield lighting and sign system is provided through a redundant radio link with the Air Traffic Control Tower. Each electrical vault has control equipment to also control the system. The

Gibson Blvd.
University Blvd.
Yale Blvd.
Girard Blvd.
Randolph Rd.
George Rd.
25
Runway 8-26 13,793' x 150'
Runway 12-30 6,000' x 150'
Runway 3-21 10,000' x 150'
Access Road B
University Blvd.
Access Road A

LEGEND

- Airport Property Line
- Lease Line

Utilities

- Gas
- Communications
- Aviation Fuel
- Water
- Sanitary Sewer
- Electrical
- Storm Drainage

NORTH

0 1,600

SCALE IN FEET

Aerial Source:
Google Earth 3/9/2014

Exhibit 1Y
UTILITIES

This page intentionally left blank

airfield lighting and control system is a fail-safe system where all the lights and signs on the airfield will come on if the control system fails.

AREA LAND USE

Albuquerque International Sunport is located in a relatively mature area towards the south end of the City of Albuquerque. Not unlike many urban airports in the United States, area land use surrounding the Sunport can have a significant impact on airport operations and growth. **Exhibit 1Z** illustrates the generalized existing land uses in the vicinity of the airport. Understanding the land use issues surrounding the airport will assist in making appropriate recommendations for the future sustainability of the airport in the way of both environmental compatibility and economic development.

Land surrounding the Sunport falls primarily within three jurisdictions: The City of Albuquerque, KAFB, and Unincorporated Bernalillo County. KAFB is north, east, and southeast of the Sunport. There are more mature residential land uses to the north, northwest, and southwest. South of the Sunport are newer residential developments. Commercial and retail land uses are primarily located along the arterial streets, such as Yale Blvd. and Gibson Blvd. in the vicinity of the Sunport. Industrial, manufacturing, and warehousing land uses are primarily located west of I-25.

Land surrounding the Sunport falls primarily under three jurisdictions: The City of Albuquerque, KAFB, and Unincorporated Bernalillo County.

Exhibit 1AA presents the generalized zoning surrounding the Sunport. Areas directly to the west are generally zoned for industrial/wholesale/manufacturing uses. Properties to the immediate north of the terminal area and south of Gibson Blvd. are also zoned for industrial/wholesale/manufacturing uses; however, an established neighborhood south of Gibson and east of I-25 zoned for residential uses. Areas north of Gibson Blvd. are more established residential zones.

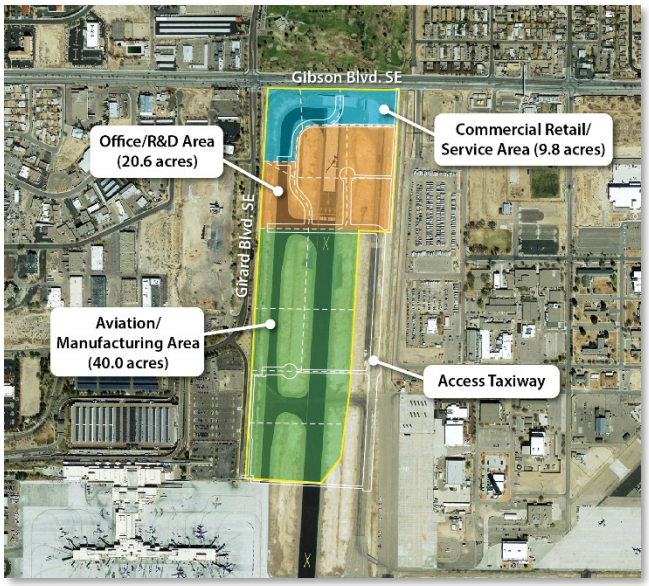
There are several parcels on Sunport property that have specific zoning. The rental office space at 2700 Yale Blvd. is zoned for commercial uses. The property west of Girard Blvd. and north of the Sunport Blvd. Loop Road is zoned for industrial/wholesale/manufacturing uses. A small parcel west of University Blvd. and south of Sunport Blvd. is zoned for institutional/government uses as is a parcel in the southwest corner of Sunport property, west of University Blvd.

OTHER LAND USES

Several parcels, both on- and off-Sunport property, are noted below because of their potential influence on current or future Sunport development plans. **Exhibit 1BB** identifies the location of these areas.

Aviation Center of Excellence: With the closure of Runway 17-35, approximately 75 acres of land just northeast of the terminal complex became avail-able for redevelopment. The City of Albuquerque has

initiated a project called Destination Sunport to promote the area as an emerging business hub supporting collaboration among Albuquerque's research and development community and the global marketplace. The centerpiece of Destination Sunport is the Aviation Center of Excellence (ACE). ACE is planned to accommodate strategic aerospace and aviation innovations and partnerships. Destination Sunport will also host The Landing, a convenience retail and restaurant development at the north end of the site adjacent to Gibson Boulevard.



The property is bounded on the west by Girard Boulevard, to the north by Gibson Boulevard, to the east by Kirtland Air Force Base, and the Sunport to the south. The existing zoning for the subject property is SU-1 for Airport and Related Facilities and is within the Established Urban area as designated by the *Albuquerque/Bernalillo County Comprehensive Plan*.

The Site Plan for Subdivision (Project# 1000270; 14EPC-40024) for the property was approved in 2014 by the Environmental Planning Commission. All development on the ACE property will be subject to the Design Standards contained in the Site Plan for Subdivision, which addresses elements, including site design, signage, lighting, permissive uses, utilities, architecture, sustainability, and landscaping. Lot lines on the Site Plan are illustrative and future projects have been delegated to the Design Review team (DRT) for approval. Development is intended to create an employment center that offers a variety of jobs ranging from entry level to highly skilled.

The City Aviation Department has determined that the highest and best use for this property is to lease for commercial, office/R&D, and aviation-related development. The City Aviation Department plans to enter long-term ground leases with developers, which provides the benefit of lower upfront capital requirements. The property has direct access to the Sunport's airfield, which will provide tenants with access and connectivity. Commercial uses are strategically located along Gibson Boulevard to serve surrounding communities, as well as ACE workers, Kirtland Air Force Base, and others commuting along Gibson Boulevard. The office/R&D and aviation-related development will be located farther south on the property.

Sunport Business and Technology Center: This 65-acre property is owned by the City Aviation Department and is referred to as the Sunport Business and Technology Center. The property is located on University Boulevard, between Clark Carr Road and Spirit Drive. The northern portion of the property is within the Established Urban area as designated by the *Albuquerque/Bernalillo County Comprehensive Plan*, while the southern portion of the property is within the Developing Urban area.

Gibson Blvd.

Sunport Blvd.

25

University Blvd.

Unincorporated Area

City of Albuquerque

Unincorporated Area

NORTH

Scale: 1" = 2,500'

Source: City of Albuquerque GIS Data Download at:
http://www.cabq.gov/gis/geography-information-systems-data

Source: Google Earth, image date 3/9/2014

Legend

Albuquerque Land Use Categories

- Agriculture
- Commercial Retail
- Commercial Service
- Drainage / Flood Control
- Industrial / Manufacturing
- Multi Family Housing
- Parking Lots / Structures
- Parks / Recreation
- Public / Institutional
- Single Family Housing
- Transportation / Utilities
- Vacant / Other
- Wholesale / Warehousing

This page intentionally left blank

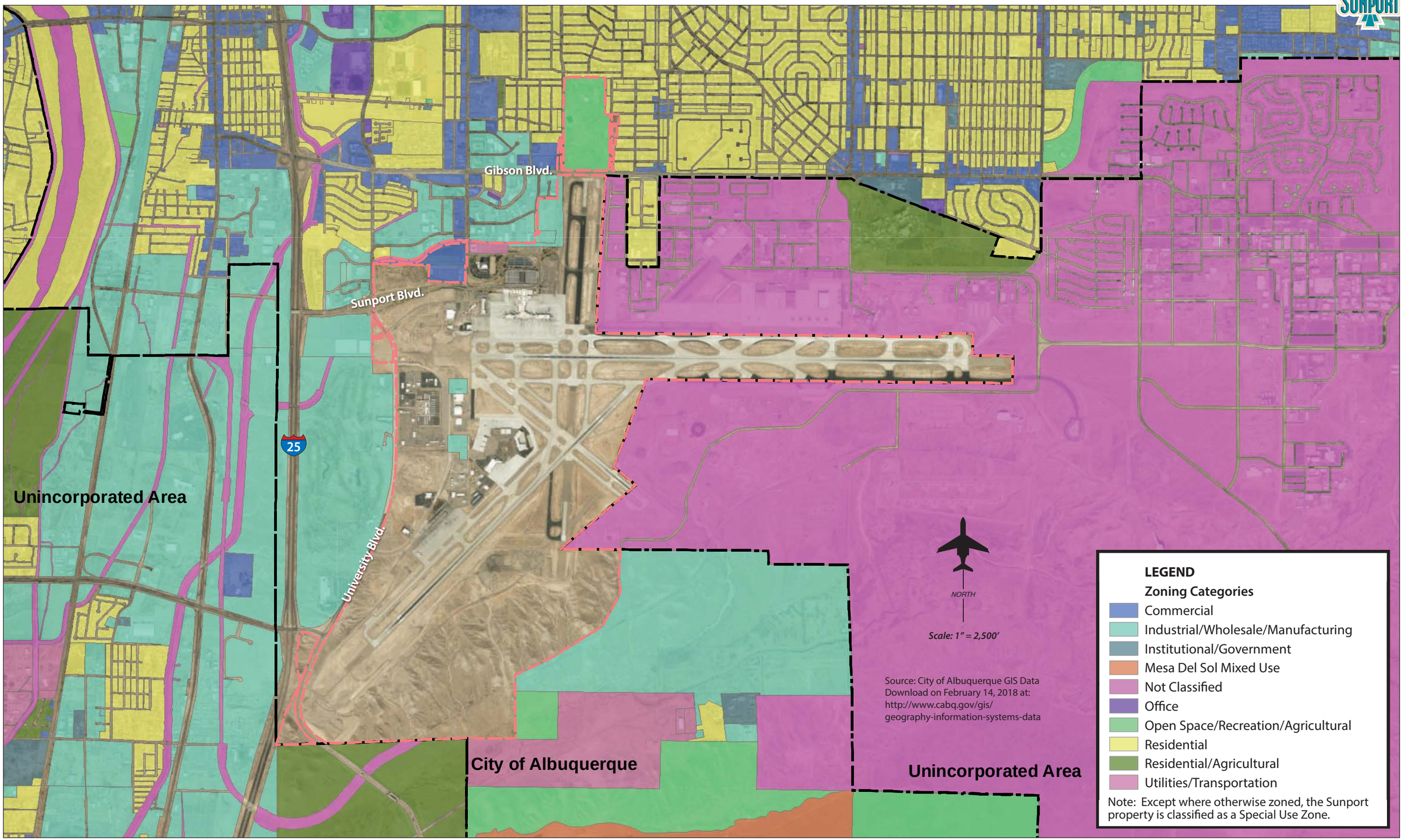


Exhibit 1AA
EXISTING ZONING TYPES

This page intentionally left blank

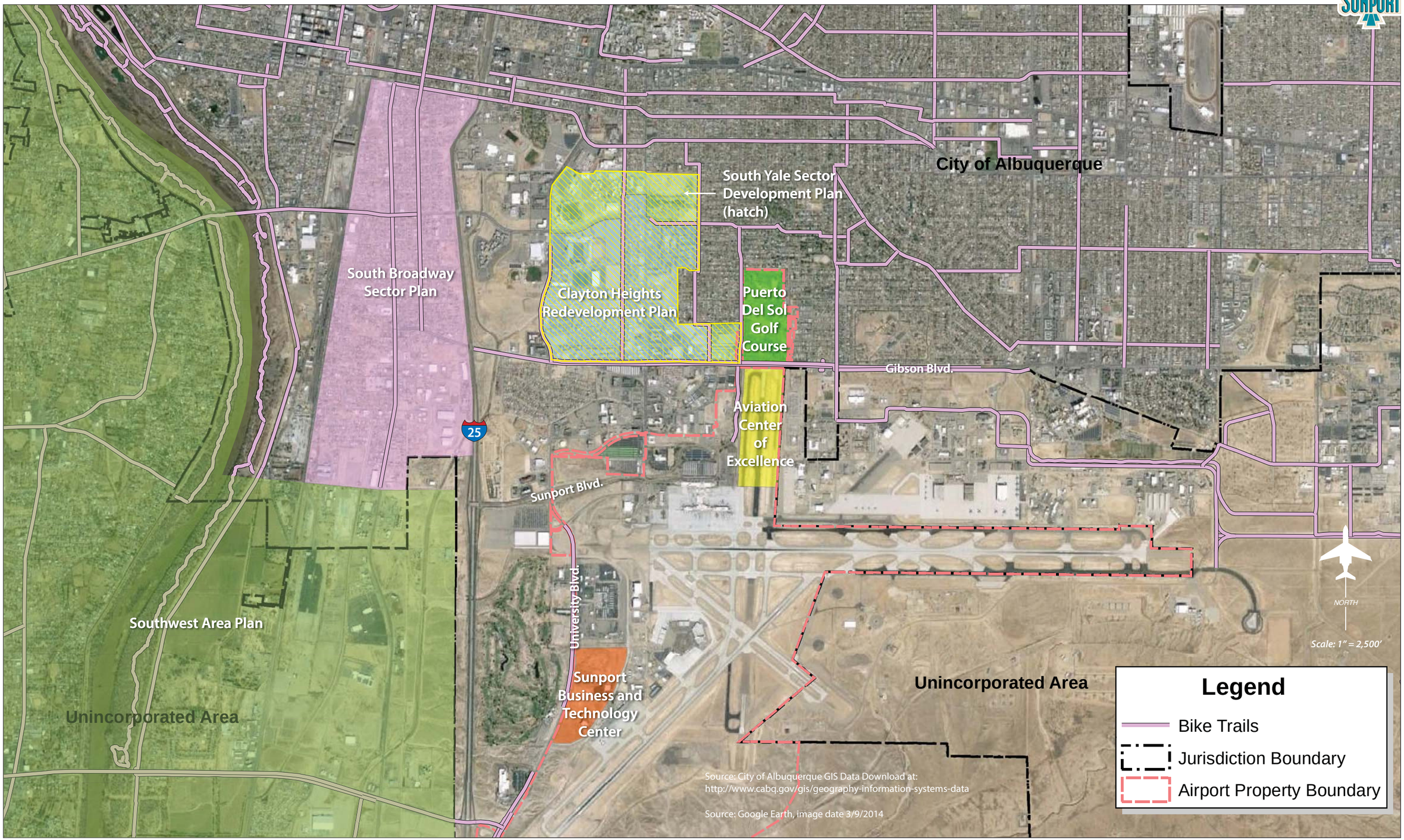


Exhibit 1BB
AREA PLANS AND BIKE TRAILS

This page intentionally left blank

The Sunport business and Technology Center is a designated Foreign Trade Zone.

In 2000, the site was authorized as a Foreign Trade Zone (FTZ) by City Council (Enactment# R-2000-119). The FTZ designation allows companies to bring in raw materials or finished goods, which they can store, assemble, re-package, grade, manufacture, or re-export, without paying duty, thus lowering the cost of production and incentivizing relocation to Albuquerque. The existing zoning for the subject property is SU-1 for Airport and Related Facilities.

The Site Plan for Subdivision (Project# 1001157; 08EPC - 40002) for the property was approved in 2008 by the Environmental Planning Commission. No zoning changes were proposed. Development for the site is intended to include a wide range of commercial, office, warehouse, manufacturing, hotel/motel and incidental uses, institutional, educational, laboratory, and industrial uses, which are all allowable under the site's current zoning. The property will locate employment in an area complementary to future residential areas at Mesa Del Sol and will be designated as a "Certified Site" (i.e., a site that has already obtained many of the necessary approvals for development). With the+ provision of the Design Standards included in the Site Plan for Subdivision, future Site Plan for Building Permits have been delegated to the City Planning Director and shall not require a public hearing, provided they are consistent with the Site Plan for Subdivision and Design Standards. Lot lines on the Site Plan for Subdivision are illustrative and shall be determined in subsequent platting and Site Plans for Building Permit. This designation will remove obstacles to economic development efforts, thus incentivizing development through a streamlined development process.

Puerto Del Sol Golf Course: The Puerto Del Sol Golf Course covers approximately 72 acres. The property is owned by the Aviation Department and operated through a lease/agreement with the City of Albuquerque Parks and Recreation Department. It is bounded by Gibson Boulevard on the south, Girard Boulevard on the west, Wellesley Drive on the east, and the Kathryn Avenue alignment on the north. The existing zoning for the subject property is SU-1 for Golf Course and Related Facility.

Open Space: Over 100 acres of undeveloped open space land exists within the Sunport property area. This open space is located in the southeast portion of the property. Access to this portion of the Sunport area property is limited as it is just southeast of an existing runway. Additional constraints to development of this property include the existing topography and drainage considerations. Local streets that border this open space are Ira Sprecher Road to the east and Los Picaros Road to the south. Future development of this property would be subject to the Sunport Master Plan and the City's development approval process.

LOCAL PLANNING DOCUMENTS AND POLICIES

The City of Albuquerque has a multi-tiered planning process that includes three levels of plan ranking. The Rank I Plan is the *Albuquerque/Bernalillo County Comprehensive Plan*, which provides overarching policies for both the City of Albuquerque and Bernalillo County. The City Planning Department started the process of updating the Comprehensive Plan and creating a unified development code in February

2015. The planning process took two years for completion. The overall intent of the unified development code is to streamline and clarify the development process. The Comprehensive Plan was recently updated and adopted in March of 2017. Additionally, the City adopted the Integrated Development Ordinance (IDO) in November 2017. The IDO will become effective on May 17, 2018. The IDO was created as a new zoning code for the City. As part of this effort, all existing lower-level Rank II and III plans have been consolidated. Prior to the IDO, those plans addressed sub-regions of the City and specific City-wide system plans. Rank III Plans included Sector Development Plans that address specific planning issues for individual neighborhoods. These are now all included under the umbrella of the IDO. There are a couple of sector plans that fell within the Sunport area. These addressed zoning and development concerns that may or may not include infrastructure and storm drainage issues and are now covered by IDO provisions and regulations. Other types of Rank III Plans that have not been consolidated as part of the IDO effort include Corridor Plans and Metropolitan Redevelopment Area Plans (MRAs). MRA plans target specific properties or areas that are considered "blighted" and Corridor Plans develop design overlay zones for the plan area and sometimes view preservation policies.

ALBUQUERQUE/BERNALILLO COUNTY COMPREHENSIVE PLAN

The Albuquerque Sunport is nearby the Sunport/Airport Employment Center, as designated by the Comprehensive Plan. The Sunport and surrounding properties are designated as both areas of consistency and change by the Comprehensive Plan. As noted in the Comprehensive Plan, areas of consistency include "Airport runways and fly-in zones," and areas of change include "parcels within Metropolitan Redevelopment Areas (MRAs)" and "properties within approved Master Development Plans (site development plans with detailed design standards), such as business and industrial parks and master planned communities" (5-24). More specifically, the properties surrounding and owned by the airport (which will be discussed in detail in later chapters) are primarily designated as areas of change by the Comprehensive Plan. Applicable policies from the Comprehensive Plan are provided below:

5.1 Centers & Corridors
The goal is to capture regional growth in Centers and Corridors to help shape the built environment into sustainable development pattern.

Centers and Corridors are designated by the Comprehensive Plan to attract private investment and protect rural areas, while offering people housing and easy access to services, employment, and arts and entertainment. The Sunport owns several property parcels that have been developed or identified for future non-aviation revenue support functions. These properties fall nearby the Sunport/Airport employment center and will serve as opportunities for economic development. As contributing properties to the Sunport/Airport employment center, these properties will prioritize opportunities for industrial and business districts supported by retail and residential uses. Employment centers are also typically auto oriented and provide excellent access for trucks and connections to freight networks. Per Policy 5.1.1 of the Centers & Corridors, Desired Growth, the intent is to "capture regional growth in Centers and Corridors to help shape the built environment into a sustainable development pattern" (5-27).

The Comprehensive Plan stipulates that Centers and Corridors are most appropriate for "employment density, compact development, redevelopment, and infill" (5-27). This policy relates to the creation of jobs through the implementation of the proposed Sustainable Airport Master Plan. Policy 8.1.3, of the Economic Development Goal states that, "Focus economic development strategies, programs, and activities to support existing and emerging economic base industry clusters that are important to the region" (8-28).

The Sunport/Airport Employment Center provides a unique attraction that serves regional and statewide needs. The intent is for all Employment Centers to be accessible by all modes of travel, depending on the nature of uses, located on or accessible by major roadways, and served mainly by off-street parking. The interior of an Employment Center should be accommodating to the pedestrian, even within off-street parking areas. The Employment Centers description provided in the Comprehensive Plan Land Use Chapter states that "Employment Centers tend to be auto-oriented and need to provide excellent access for trucks and connections for freight. For this reason, Employment Centers should be located near major intersections or along highways or major arterial." This highlights the characteristics of the Sunport and supporting services (5-15).

5.3 Efficient Development Patters

The goal is to promote development patterns that maximize the utility of existing infrastructure and public facilities and the efficient use of land to support the public good.

The Comprehensive Plan notes the importance of energy management techniques and use of alternative and renewable energy sources, such as solar, wind, solid and liquid waste, and geothermal supplies. The Comprehensive Plan identifies the need for development and management of public services/facilities in an efficient and equitable manner.

5.6 City Development Areas

The goal is to encourage and direct growth to Areas of Change where it is expected and desired and ensure that development in and near areas of Consistency reinforces the character and intensity of the surrounding area.

The Albuquerque Sunport is a designated Center and Corridor, Metropolitan Redevelopment Area, and governed by this Sustainable Airport Master Plan, whose surrounding properties have been mapped as areas of change. Areas of changes are noted to be prime locations for redevelopment and new development. These areas would also benefit from infill or revitalization. The growth anticipated for these areas will be served with transit and other infrastructure.

6.2 Multi-Modal System

The goal is to encourage walking, biking, and transit, especially at peak-hour commuting times, to enhance access and mobility for people of all ages and abilities.

As stipulated in Policy 6.2.10.2, the Comprehensive Plan calls for the "Study and plan the future of the Albuquerque Sunport, including roadway alignments, interface with the Kirtland Air Force Base, economic development impacts, environmental impacts, and selection for other reliever airport sites on a regional basis"(6-46).

The Comprehensive Plan identifies the need for a multidisciplinary study of this aviation facility. This Sustainable Airport Master Plan addresses this policy and falls within the Comprehensive Plan implementation plan.

6.6 Economy
The goal is to invest in a transportation system that stimulates and supports job creation and business development and improves the movement of people, goods, and services.

As stipulated in Policy 6.6.3(b), the Comprehensive Plan calls to "Improve connectivity of airports to the freight and rail networks and support land uses and development patterns that bolster nearby employment opportunities."

The Sustainable Airport Master Plan addresses the needs for air freight facilities and supports land use and development patterns both on and around the airport property to enhance employment opportunities.

8.1 Placemaking
The goal is to create places where business and talent will stay and thrive.

The Sunport and surrounding properties can contribute to the overall economic development of the City and County by continuing to exist and expand as a regional hub for employment, services, and urban living. Current and future public-private partnerships will help cultivate new local businesses that leverage our local and cultural assets and existing industrial clusters. These partnerships will "strengthen and diversify the economic base to help reduce reliance on government spending" (8-28).

11.3 Cultural Landscapes
The Goal is to protect, reuse, and/or enhance significant cultural landscapes as important contributors to our heritage and rich and complex identities.

The Comprehensive Plan identifies policies that address the need to promote the efficient placement of housing, employment, and services to foster a balanced land use/transportation system.

Bikeways & Trails Facility Plan

The Bikeways & Trails Facility Plan, a Rank II Plan, was adopted by the City Council in May 2015. The primary goal of the Bikeways & Trails Facility Plan is to "ensure a well-connected, enjoyable, and comfortable non-motorized transportation and recreation system throughout the metropolitan area." The Plan is intended to guide the development, maintenance, upgrades, and administration of trails, bicycle lanes, bike routes, and bicycle boulevards throughout the City. The Plan updated, consolidated, and replaced the Trails and Bikeways Facility Plan (1993) and the Comprehensive On-Street Bicycle Plan (2000).

A multi-use paved trail exists along the north side of Gibson Boulevard and will eventually extend south on Girard Boulevard. There is a dedicated bicycle lane within the Gibson right-of-way. The Bikeways & Trails Facility Plan proposes to add a bike lane just south of Sunport Boulevard along George Road and north of Sunport Boulevard along Randolph Road. It would connect to the existing trail on Yale Boulevard, just south of Gibson Boulevard. A paved trail is also proposed for University Boulevard that would connect to the George Road and Randolph Road proposed bike lanes.

South Yale Area

The South Yale Sector Development Plan Goals and Policies have been incorporated as part of the updated Comprehensive Plan and covers the area south of St. Cyr Avenue and north of Gibson Avenue, between University Boulevard and Columbia Drive, north of the Sunport Master Plan Area and the University of New Mexico. Yale Boulevard is an established entryway into the city from the Sunport. Small Area Regulations provided in the IDO apply to the South Yale Area. These regulations cover use regulations related to prohibited uses and design standards.

Clayton Heights Metropolitan Redevelopment Area (MRA) Plan

The Clayton Heights MRA Plan encompasses South Yale Boulevard and is surrounded by the Sunport, Kirtland Air Force Base, Nob Hill shopping district, University of New Mexico, and UNM Science and Technology Park. The Clayton Heights MRA Plan area falls within the South Yale SDP area boundaries. The South Yale SDP is a form-based code that creates a walkable mixed-use environment that supports the revitalization of the area. The Clayton Heights MRA Plan incorporates the higher intensity mix uses permitted in the South Yale SDP.

The Clayton Heights MRA Plan identifies three major goals:

- Establish a viable commercial environment,
- Revitalize area into walkable safe neighborhoods, and
- Improve housing conditions and increase homeownership.

The Plan identifies several traffic issues and calls for improvements to roadways, including channelization changes, creating signalized intersections, and proposed lane reductions. The suggested improvements apply to the intersections of Kathryn Avenue and Yale Boulevard, Avenida Cesar Chavez and Buena Vista Drive, and propose the redevelopment of Yale Boulevard.

Other Plan recommendations include the rehabilitation of deteriorated homes in the Clayton Heights area through perpetual deferred loans and low-interest fixed-rate loans. The Plan also encourages the development of numerous vacant lots along Yale Boulevard as retail, office, and residential uses, and those closer to Gibson Boulevard as hotel/restaurant uses. A “gateway neighborhood concept” is proposed for Clayton Heights. The Plan calls for this design element to establish a portal to the Sunport,

Isotope Park, UNM's sports facilities, as well as UNM's southern entrance on Yale Boulevard. Three gateway locations are proposed by the Plan, one of which is just north of the Sunport, on Gibson Boulevard.

South Broadway Area

The South Broadway Sector Development Plan Goals and Policies have been incorporated as part of the updated Comprehensive Plan and is bounded by Coal Avenue to the north, Woodward Avenue to the south, railroad tracks on the west, and Interstate 25 to the east. The South Broadway area is home to some of the oldest neighborhoods in the City. In 1986, the South Broadway Neighborhoods Plan Area was designated as a Metropolitan Redevelopment Area. As a designated MRA, the City's Metropolitan Redevelopment Agency is responsible for infill development within the designated area. The Agency is also responsible for promoting the development of neighborhoods through housing and commercial revitalization.

Small Area Regulations provided in the IDO apply to the South Broadway Area. These regulations cover use regulations related to prohibited uses and design standards.

Roadway Functional Classification System

The Mid-Region Council of Governments (MRCOG) identifies the functional classifications of roadways. Gibson Boulevard and Sunport Boulevard are classified as Limited-Access Principal Arterials and Girard Boulevard is classified as an Urban Collector. Proposed access points must be sponsored by the owner of the facility (City of Albuquerque) and approved by the Transportation Coordinating Committee of MRCOG.

Futures 2040 Metropolitan Transportation Plan (MTP)

The Futures 2040 MTP is a long-range transportation plan for the greater Albuquerque area. The Plan includes short- and long-range strategies and action items for the development of a multimodal transportation system that improves mobility for people and goods throughout the region. The Plan is developed by the Mid-Region Metropolitan Planning Organization (MRMPO) who is the transportation arm of MRCOG. The MTP is a federally required document for urban areas with a population of more than 50,000. It is a living document, intended to be updated and continually revisited as urban areas grow and change, funding situations evolve, new analysis methods become available and different transportation needs and priorities are identified.

The Futures 2040 MTP identifies planned transportation improvements. Yale, University, and Sunport Boulevards are identified as priority transportation improvement corridors, as well as future bikeway and trail projects. The MTP has a goal of 20 percent mode share on priority corridors.

The MTP lists several planned projects for the Sunport area:

- Sunport Boulevard Extension- The construction of a new four-lane divided facility with bike lanes, which includes signage, drainage, and other necessary appurtenances. This fully funded project will extend from Broadway to I-25, Exit 221, at the Sunport. The lead agency for this project is Bernalillo County and is estimated to cost approximately $17M.

- Sunport Area Roads Improvements- The rehabilitation and/or resurfacing of Sunport Boulevard, Airport Loop, Girard Boulevard from Sunport Boulevard to Gibson Boulevard, sections of University Boulevard between Sunport Boulevard and Rio Bravo Boulevard, Spirit Drive, and Clark Carr Boulevard. The lead agency for this project is the City of Albuquerque Aviation Department. The project cost is estimated at $7M.

- Sunport Boulevard Pavement Rehabilitation- The City of Albuquerque Aviation Department is the lead for this $2M dollar project that will mill and repave Sunport Boulevard from I-25 to Girard Boulevard.

- UNM/CNM/Sunport High Capacity Transit - Planning will begin for improved transit service in the University of New Mexico/Central New Mexico Community College/Sunport area. This bus rapid transit (BRT) will operate primarily on University Boulevard, Yale Boulevard from Menaul Boulevard to the Sunport. The service will complement the nearby Albuquerque Rapid Transit (ART) service under development along Central Avenue.

Sunport Boulevard Area

The Sunport Boulevard area is included in the IDO Small Area Regulations that intend to provide specialized sign controls for the area surrounding Sunport Boulevard between Interstate 25 and Yale Boulevard. Specifically, no off-premise signs are allowed, and on-premise signs shall be limited to wall signs and free-standing signs.

The IDO requires that free-standing signs in the Sunport Boulevard Area shall not exceed 75 square feet and shall not be greater than 12 feet in height, except that properties over five acres may have one freestanding sign up to 26 feet in height within 200 feet of Sunport Boulevard. The base of freestanding signs shall be surrounded by a landscaped area of at least 36 square feet with minimum of 75 percent vegetative cover.

The size of wall signs is regulated by the maximum size of 15 percent of the façade area, inclusive of door and window openings.

SOCIOECONOMIC CHARACTERISTICS

Socioeconomic information related to the approximate airport service area is an important consideration in the master planning process by providing an understanding of the demographic dynamics of the area. As the major commercial service airport in the state, certain elements of aviation demand, such

as air cargo, may be related to the demographic trends across the whole state. Other elements may be more directly related to regional demographics.

The historic demographic trends in population, employment, and income provide insight into the long-term socioeconomic condition of the region. This information is essential in determining aviation service level requirements, as well as forecasting aviation demand elements for airports. Aviation forecasts are typically related to the population base, economic strength of the region, and the ability of the region to sustain a strong economic base over an extended period of time.

Historical population data was obtained from the U.S. Census Bureau, Population Division. Employment and income figures were obtained from Woods & Poole Economics - *Complete Economic and Demographic Data Source*, 2014. Woods & Poole utilizes information from the U.S. Census Bureau, as well as other national and state organizations for historic data and for future projections. Woods & Poole is an FAA-approved source for socioeconomic data. The historic socioeconomic information is presented on **Table 1K**.

TABLE 1K
Historical Socioeconomic Data

	1970	1980	1990	2000	2010	AAGR
Population						
New Mexico	1,016,000	1,302,894	1,515,069	1,819,046	2,059,179	1.78%
Six-County Area[1]	448,049	616,064	716,459	877,284	1,049,197	2.15%
Albuquerque MSA[2]	379,095	523,105	599,416	729,649	887,077	2.15%
Employment						
New Mexico	398,903	597,035	761,394	964,673	1,060,445	2.47%
Six-County Area	184,230	300,256	424,042	556,091	599,061	2.99%
Albuquerque MSA	152,997	248,761	347,243	455,184	492,631	2.97%
Per Capita Personal Income (PCPI - $2009)						
New Mexico	14,268	18,948	21,980	27,363	32,404	2.07%
Albuquerque MSA	15,417	20,289	24,563	31,360	33,231	1.94%

[1]Bernalillo, Sandoval, Torrance, Valencia, Santa Fe, Los Alamos Counties
[2]Bernalillo, Sandoval, Torrance, Valencia Counties
MSA: Metropolitan Statistical Area
AAGR: Average Annual Growth Rate

Source: Historical population from the U.S. Census Bureau - Population Division
Source: Employment and Income from Woods & Poole Complete Economic and Demographic Data Source (CEEDS) 2014

ENVIRONMENTAL INVENTORY

The purpose of the following environmental inventory is to identify potential environmental sensitivities that might affect future improvements at the Sunport. For the purposes of this inventory, lands and resources within one-quarter mile of the Sunport boundary are considered. The resource categories listed below are based on guidance provided within the FAA's Order 1050.1E, *Environmental Impacts: Policies and Procedures.* Resources not present within the vicinity, but included in FAA environmental

guidance, are not included in this inventory. The information contained in this section was obtained from internet resources, agency maps, and existing literature.

LAND USE AND NOISE

Existing Land Use

As previously stated, the Sunport is co-located with Kirtland Air Force Base. Combined, these two facilities encompass approximately 55,000 acres on the southeast side of the City of Albuquerque. Of the total acreage, the Sunport utilizes approximately 2,750 acres. The remaining portion of the base located southeast of the Sunport is largely undeveloped with scattered military structures. As indicated on **Exhibit 1CC**, a City of Albuquerque-owned golf course is located immediately north of the Sunport as are several residential neighborhoods and a number of public and private grade schools and parks. Much of the area immediately northeast and east of the Sunport facilities is developed with Kirtland Air Force Base facilities, including administration buildings, training facilities, and base housing. Two medical facilities are surrounded by base facilities, including the Albuquerque Veteran's Administration Medical Center, which is a registered historic district, and the Lovelace Healthcare Center. The historic Old Airport Terminal Building, located west of the current passenger terminal building, is included on the National Register of Historic Places.

The areas northwest and west of the Sunport are developed with industrial, commercial, office, and support facilities (hotels, long-term parking, car rental facilities), and residential land uses. Southwest of the Sunport is the Championship Golf Course at the University of New Mexico, beyond which is Interstate 25. Much of the area south of the Sunport is undeveloped, with the exception of the Albuquerque International Dragway, Journal Pavilion amphitheater, and scattered industrial/office uses in the Mesa del Sol planned development. The unincorporated Isleta Pueblo community is located south of the Mesa del Sol development approximately 13 miles from the Sunport.

Future Land Use

Much of the area north, east, and west of the Sunport is fully developed. Future land uses in these areas will likely mirror the existing land uses. Immediately south of the Sunport, a large development is under construction. The Mesa del Sol community, which comprises approximately 12,900 acres, is planned to include residential, commercial, and industrial land uses. The Mesa del Sol project is a joint venture between Forest City Enterprises and Covington Capital, in conjunction with the New Mexico State Land Office, the University of New Mexico, the City of Albuquerque, Bernalillo County, and the State of New Mexico. As shown on **Exhibit 1DD**, the master planned community is bound on the north by the Tijeras Arroyo, on the east by Kirtland Air Force Base, on the south by the Isleta Pueblo, and on the west by Broadway Boulevard. At build-out, the community is planned to house 100,000 residents and provide 18 million square feet of office, industrial, and retail space. Numerous schools and educational facilities are also planned

Airport Noise

Exhibit 1CC depicts the noise exposure contours prepared as part of the environmental assessment for the closure of Runway 17-35. These contours are overlaid on the existing land use map. Portions of the 65, 70, and 75 DNL contours extend beyond Sunport property. Three properties considered as noise-sensitive land uses are within the 65 DNL contour. The first property identified on **Exhibit 1CC** (#1) is located west of the Sunport and is a single-family residential land use. Location #2 is the Presbyterian Healthcare System Hospital located immediately northwest of the Sunport. Location #3 is a multi-family residential land use located northeast of the Sunport. This location is a youth and family services facility, which has 16 residential living units.

BIOTIC RESOURCES

Section 7 of the *Endangered Species Act* (ESA), as amended, applies to federal agency actions and sets forth requirements for consultation to determine if the airport development projects "may affect" a federally endangered or threatened species. If an agency determines that an action "may affect" a federally protected species, then Section 7(a)(2) requires each agency to consult with the U.S. Fish and Wildlife Service (USFWS) to ensure that any action the agency authorizes, funds, or carries out is not likely to jeopardize the continued existence of any federally listed endangered or threatened species, or result in the destruction or adverse modification of critical habitat. If a species has been listed as a candidate species, Sec. 7 (a)(4) states that each agency must confer with the USFWS.

The Sunport is located in the Albuquerque Basin, which is a sub-unit of Arizona/New Mexico Plateau ecoregion. Land cover within the study area consists of three major types: developed, ruderal, and scrub vegetation. Ruderal areas include those that have been disturbed and are now sparsely vegetated, such as infield areas between taxiways.

A Trust Resources List for the project area was prepared using the USFWS *Information, Planning, and Conservation* System (IPaC). The IPaC report indicates that six species, listed in **Table 1L**, should be considered in future effects analyses for projects at the Sunport. As indicated in the table, several of the species rely on riparian habitat associated with the Rio Grande located west of the Sunport.

TABLE 1L
Federally Listed Threatened and Endangered Species
Bernalillo County, New Mexico

Common Name	Habitat	Federal Status
Mexican spotted owl	Found in mature, montane forests and woodlands and steep, shady, wooded canyons. Can also be found in mixed-conifer and pine-oak vegetation types. Generally, nests in older forests of mixed conifers or ponderosa pine–Gambel oak. Nests in live trees on natural platforms (e.g., dwarf mistletoe brooms), snags, and canyon walls at elevations between 4,100 and 9,000 feet msl.	Threatened
Rio Grande silvery Minnow	The silvery minnow critical habitat designation in the Rio Grande extends from Cochiti Dam, Sandoval County, New Mexico (NM) downstream to the utility line crossing the Rio Grande, a permanent identified landmark in Socorro County, NM, a total of approximately 157 miles.	Endangered

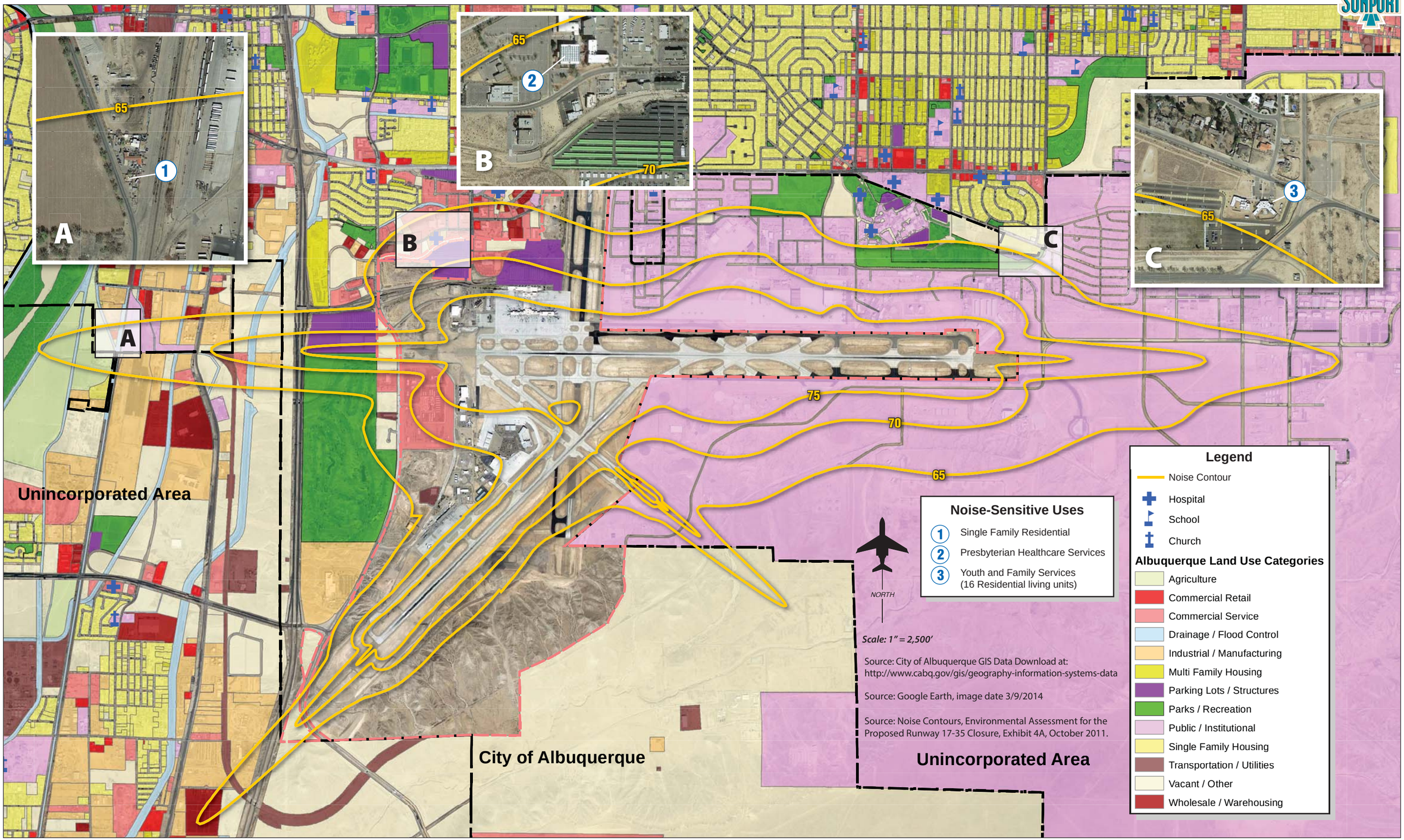


Exhibit 1CC
LAND USE WITH NOISE CONTOURS

This page intentionally left blank

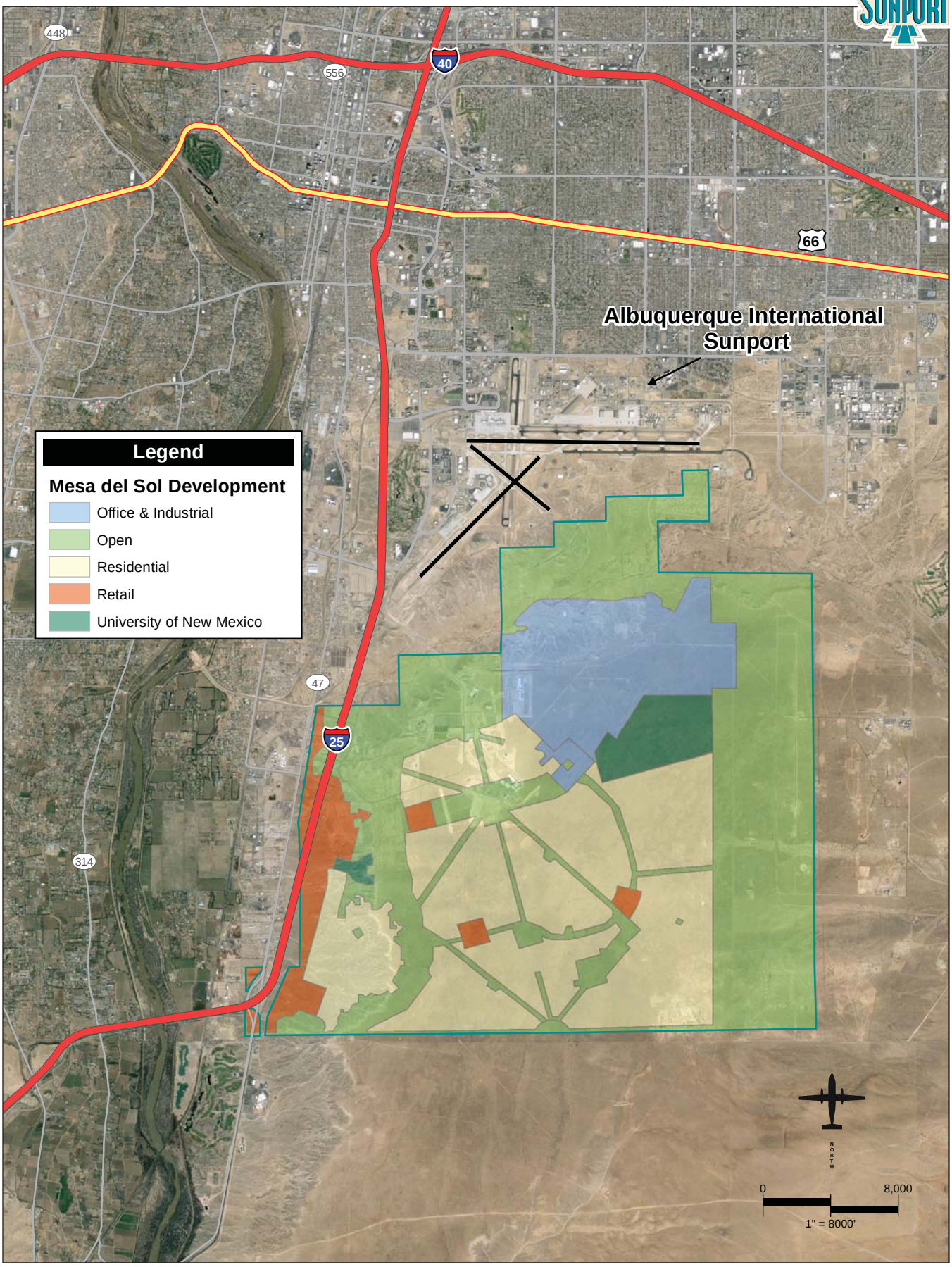


Exhibit 1DD
MESA DEL SOL DEVELOPMENT PLAN

Southwestern willow flycatcher	Found in dense riparian habitats along streams, rivers, and other wetlands where cottonwood, willow, boxelder, saltcedar, Russian olive, buttonbush, and arrowweed are present. Habitat occurs at elevations below 8,500 feet msl.	Endangered
Yellow-billed Cuckoo	Typically found in riparian woodland vegetation (cottonwood, willow, or saltcedar) at elevations below 6,600 feet msl. Dense understory foliage appears to be an important factor in nest site selection.	Threatened
New Mexico meadow jumping mouse	Found in two riparian community types: persistent emergent herbaceous wetlands or crub-shrub wetlands (i.e., riparian areas along perennial streams that are composed of willows and alders. It especially uses microhabitats of patches or stringers of tall dense sedges on moist soil along the edge of permanent water.	Endangered
Sprague's Pipit	Strong preference to native grasslands with vegetation of intermediate height and lacking woody shrubs.	Candidate

In addition to the ESA, the *Migratory Bird Treaty Act* (MBTA) is also applicable at the Sunport as much of the study area constitutes habitat for birds protected under the MBTA. The IPaC report for the airport lists 25 bird species that may be affected by projects at the Sunport.

Birds protected under the MBTA may nest, winter, or migrate throughout the area, including those protected by the ESA. Under the requirements of the MBTA, all project proponents are responsible for complying with the appropriate regulations protecting birds when planning and developing a project. Migratory birds known to occur in the study area are listed in **Table 1M**.

TABLE 1M
Birds Protected Under the *Migratory Bird Treaty Act*
Bernalillo County, New Mexico

Bald Eagle	Juniper Titmouse
Bendire's Thrasher	Lewis's Woodpecker
Black-chinned Sparrow	Loggerhead Shrike
Brewer's Sparrow	Lucy's Warbler
Brown-capped Rosy-Finch	Mountain plover
Burrowing Owl	Olive-Sided flycatcher
Chestnut-collared Longspur	Pinyon Jay
Costa's Hummingbird	Prairie Falcon
Flammulated Owl	Red-headed Woodpecker
Fox Sparrow	Swainson's hawk
Golden Eagle	Williamson's Sapsucker
Grace's Warbler	Willow Flycatcher
Gray Vireo	

The only designated critical habitat area within the vicinity of the airport is for the Rio Grande silvery minnow. The critical habitat is the Rio Grande, located 2.5 miles west of the Sunport terminal building.

WATER QUALITY

The Sunport and the associated study area for this inventory are located within the City of Albuquerque (HUC #130202030304) and the Lower Tijeras Arroyo (HUC #130202030203) watersheds.[1] According to

[1] National Hydrography Dataset, http://viewer.nationalmap.gov/viewer/nhd.html, accessed February 2015

the US EPA's EJView website, the proposed project area does not contain any waters listed in the *Clean Water Act*, Section 303(d) list (Impaired Waters List).[2]

The only water supply source to the project area is the Santa Fe Group Aquifer. In 2002, the New Mexico Environment Department (NMED) conducted a Source Water Assessment to determine how susceptible the Santa Fe Group aquifer wells are to contamination. NMED concluded that the wells are well-maintained and operated and are generally protected from potential sources of contamination. Wells near known contamination sites are ranked highly susceptible to contamination. Potential sources of contamination include businesses that use hazardous chemicals, such as automotive repair shops, gas stations, dry cleaners, paint and hardware stores, car washes, construction sites, golf courses, interstate highways and city streets, military facilities, sewer lines and septic tanks, and unlined arroyos, ditches, and drainage canals.

The Albuquerque area uses water obtained through the San Juan-Chama Drinking Water Project. This project diverts San Juan-Chama river water to a treatment plant north of Albuquerque. The finished water is distributed to customers for drinking water and is blended with groundwater supplies during the summer or in times of drought.

WETLANDS

The U.S. Fish and Wildlife Service's National Wetlands Inventory indicates that there are no wetlands located within the study area.[3] Further investigation of soil types at the Sunport also indicates the absence of wetlands. In general, wetlands exhibit three characteristics: hydrology, hydrophytes (plants able to tolerate various degrees of flooding or frequent saturation), and poorly drained soils. A review of the Natural Resource Conservation Service's Web Soil Survey indicates that no hydric soils are located on airport property.[4]

There are no wetlands located within the study area.

FLOODPLAIN AND FLOODWAYS

As defined in FAA Order 1050.1E, agencies are required to "make a finding that there is no practicable alternative before taking action that would encroach on a base floodplain based on a 100-year flood." E.O. 11988, *Floodplain Management,* directs federal agencies to reduce the risk of flood loss, minimize the impact of floods on human safety, health and welfare, and restore and preserve the natural and beneficial values served by the floodplains. Natural and beneficial values of floodplains include providing groundwater recharge, water quality and maintenance, fish, wildlife and plants, open space, natural beauty, outdoor recreation, agriculture, and forestry. FAA Order 1050.1E (9.2b) indicates that "if the proposed action and reasonable alternatives are not within the limits of, or if applicable, the buffers of a base floodplain, a statement to that effect should be made"; no further analysis is necessary. The limits

[2] U.S. EPA EJView, http://epamap14.epa.gov/ejmap/ejmap.aspx, accessed February 2015
[3] National Wetlands Inventory, http://www.fws.gov/wetlands/Data/Mapper.html, accessed February 2015
[4] NRCS web soil survey, http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx, accessed February 2015

of base floodplains are determined by Flood Insurance Rate Maps (FIRMs) prepared by the Federal Emergency Management Agency (FEMA).

Much of the Sunport property is designated as Zone X, which is an area of minimal flood hazard. Immediately south of the Sunport are areas designated as floodway and 100-year floodplain. In one area, the 100-year floodplain is located on Sunport property; this is located at the extreme southern boundary of the airport. Areas within the Kirtland Air Force Base property are designated as Zone D, which is described as an area where there are possible but undetermined flood hazards, as no analysis of flood hazards has been conducted.

GEOLOGY AND SOILS

Based on a review of the Geologic Map of New Mexico, 2003, published by the New Mexico Bureau of Geology and Mineral Resources, the Sunport is underlain by two geologic units: Upper Santa Fe group (QTs) and Alluvium (Qa).[5] The Upper Santa Fe group is described as basin fill of the Rio Grande rift and locally represents upper Miocene formations of the middle Santa Fe Group in the northern Albuquerque Basin. The southern portion of the airport is described as alluvium, which is unconsolidated or loose soil associated with the Tijeras Arroyo.

Information available from the U.S. Department of Agriculture, Natural Resources Conservation Service Web Soil Survey indicates that much of the Sunport and surrounding area is classified as sandy loam associated with the Tijeras Arroyo to the south and the Rio Grande to the west. This soil type is associated with alluvial flats and floodplains.

SOLID AND HAZARDOUS WASTE SITES

The two statutes of most importance to the FAA when implementing airport development projects are the *Resource Conservation Recovery Act* (RCRA) (as amended by the *Federal Facilities Compliance Act of 1992*) and the *Comprehensive Environmental Response, Compensation, Liability Act* (CERCLA), as amended (also known as Superfund). RCRA governs the generation, treatment, storage, and disposal of hazardous wastes. CERCLA provides for cleanup of any release of a hazardous substance (excluding petroleum) into the environment.
SNL, located on Kirtland Air Force Base, is a multi-purpose engineering and science laboratory owned by the Department of Energy (DOE) and co-operated by Sandia Corporation, a subsidiary of Lockheed Martin, and the DOE. SNL designs non-nuclear components for the nation's nuclear weapons, performs a wide variety of energy research and development projects, and works on assignments that respond to national security threats. SNL generates wastes that are regulated under the *Resource Conservation and Recovery Act* (RCRA), the *New Mexico Hazardous Waste Act*, and implementing regulations.

[5]Geologic Map of New Mexico, https://geoinfo.nmt.edu/publications/maps/geologic/state/home.cfml, accessed February 2015

Solid waste at the Sunport is collected by the City of Albuquerque and transported to the Cerro Colorado Landfill, located approximately 25 miles west of the airport. This landfill has a 20-year operating permit, which was renewed in April 2001 for 180 acres of waste disposal. Cerro Colorado has a life expectancy of 50 years and complies with all state solid waste management regulations.

There are no open landfills located within the study area. A transfer station (convenience center) located in Montesa Park south of the Sunport, is just over 600 feet southeast of the south end of Runway 17-35.

A review of the EPA's EJView website indicates that there are no CERCLA sites or sites on the National Priorities List within the study area.

HISTORIC AND CULTURAL RESOURCES

A search of the National Park Service's National Register of Historic Places (NRHP) indicates two properties listed on the NRHP are within the study area: the Old Albuquerque Terminal Building (SR# 482) and the Albuquerque Veterans Administration Medical Center Historic District, located immediately northeast of Kirtland Air Force Base. Additionally, the Sunport is located within the vicinity of the Pueblo of Isleta religious and cultural sites.

The Old Airport Terminal Building is on the National Register of Historic Places.

Additionally, as part of the 1994 *Environmental Assessment for the Improvements to Runway 3-21*, a literature search and field survey was conducted in 1993 to identify cultural resources in the vicinity of the proposed runway extension project. Two archaeological sites with the "potential to yield information important to the prehistory of the region and which have possible National Register significance" were located. A "prehistoric cultural locality" was also identified during the survey. This site was identified as an old Anasazi site. This site was excavated, mapped, artifacts removed, and cataloged by Mariah Associates.

The first archaeological site contained a scatter of ceramic and lithic artifacts. The site area was located between the extended runway and its taxiway and had been leveled and extensively disturbed. The original site was likely confined to a smaller area and the artifacts later scattered as the result of a grading operation. No structural features are visible, but the surveyor noted that subsurface structures and cultural sediments may exist. The surveyor hypothesized the site was probably a small hamlet settlement of Socorro Phase affinity.

The second archaeological site contained a scatter of lithic artifacts and fire-cracked rock debris. The fire-cracked debris indicated the presence of a hearth structure(s). The surveyor noted that it was probable that the site area was buried by low dune formation. According to the surveyor, the site was probably Late Archaic Period encampments and may contain hearths and possible shelter basins or shallow pit houses. The prehistoric cultural locality contained six obsidian flakes. No associated structural features or cultural sediments were located.

DOCUMENT SOURCES

A variety of sources were used during the inventory process. The following listing reflects a partial compilation of these sources. In addition, considerable information was provided directly to the consultant by staff at Albuquerque International Sunport.

Airport/Facility Directory, Southwest, U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office, effective November 13, 2014.

Albuquerque Sectional Aeronautical Chart, U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office, effective October 16, 2014.

National Plan of Integrated Airport Systems (NPIAS), U.S. Department of Transportation, Federal Aviation Administration, 2013-2017.

U.S. Terminal Procedures, Southwest, U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office, effective November 13, 2014.

New Mexico Airport System Plan Update 2009. Prepared by Wilbur Smith Associates.

Airport Master Plan, 2003. Prepared by Coffman Associates.

West Area Support Plan, 2011. Prepared by Coffman Associates.

A number of internet websites were also used to collect information for the inventory chapter. These include the following:

U.S. Census Bureau
http://www.census.gov

U.S. Bureau of Labor Statistics
http://www.bls.gov

Bureau of Economic Analysis, U.S. Department of Commerce
http://www.bea.gov

FAA 5010 Data:
http://www.airnav.com
http://www.gcr1.com/5010Web

New Mexico Department of Transportation – Aviation Division
http://nmshtd.state.nm.us/main.asp?secid=10871

City of Albuquerque:
http://www.cabq.gov/

Bernalillo County:
http://www.bernco.gov/

Mid-Region Council of Governments of New Mexico:
http://www.mrcog-nm.gov/

U.S. Fish and Wildlife Service Information, Planning, and Conservation System:
http://ecos.fws.gov/ipac/

FEMA Map Service Center:
https://msc.fema.gov/portal/

EPA MyWaters Mapper:
http://watersgeo.epa.gov/

Chapter Two

AVIATION DEMAND FORECASTS

Sustainable Airport Master Plan

Chapter Two

AVIATION DEMAND FORECASTS

The definition of demand that may be reasonably expected to occur during the useful life of an airport's key components (e.g., runways, taxiways, terminal buildings, etc.) is an important factor in facility planning. In airport master planning, this involves projecting aviation activity for at least a 20-year timeframe. Aviation demand forecasting for the Albuquerque International Sunport (ABQ) will consider commercial passenger enplanements (boardings), air cargo (enplaned tons), based aircraft, and aircraft operations.

The Federal Aviation Administration (FAA) has oversight responsibility to review and approve aviation forecasts developed in conjunction with airport planning studies. In addition, aviation activity forecasts may be an important input to future benefit-cost analyses associated with airport development, and FAA reviews these analyses when federal funding requests are submitted.

The FAA will review individual airport forecasts with the objective of comparing them to its *Terminal Area Forecasts* (TAF) and the *National Plan of Integrated Airport Systems* (NPIAS). Even though the TAF is updated annually, in the past there almost always was a disparity between the TAF and master planning forecasts. This was primarily because the TAF forecasts did not consider local conditions or recent trends. In recent years, however, the FAA has improved its forecast model to be a demand-driven forecast for aviation services based upon local and national economic conditions, as well as conditions within the aviation industry.

The TAF projections of passenger enplanements and commercial operations at large, medium (such as the Sunport), and small hub airports are based on a bottom-up approach. The domestic enplanements are forecast by generating origin and destination (O&D) market demand forecasts using the Department of Transportation's (DOT) quarterly 10 percent sample data to model passenger flow on a quarterly basis.

The O&D passenger demand forecasts are based on regression analysis using fares, regional demographics, and regional economic factors as the independent variables. The O&D forecasts are then combined with DOT T-100 segment data to generate passenger forecasts by airport pair and segment pair. The segment pair passenger forecasts are assigned to aircraft equipment in order to produce segment pair operation forecasts. The quarterly segment pair forecasts are aggregated to produce annual airport forecasts.

Forecasts of itinerant general aviation operations and local civil operations at FAA facilities are based primarily on time series analysis. Because military operations forecasts have national security implications, the Department of Defense (DOD) provides only limited information on future aviation activity. Hence, the TAF projects military activity at its present level except when FAA has specific knowledge of a change. For instance, DOD may announce a base closing or may shift an Air Force wing from one base to another.

As stated in FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems* (NPIAS), forecasts should be:

- Realistic;
- Based on the latest available data;
- Reflective of current conditions at the airport (as a baseline);
- Supported by information in the study; and
- Able to provide adequate justification for airport planning and development.

This forecast effort was completed in March of 2015 with a base year of 2014. Thus, the 2014 FAA *Terminal Area Forecasts* published in January 2015 were utilized. A summary of those forecasts is presented in **Table 2A**. The following sections of this chapter will discuss the reasonableness of each forecast, as well as establish the opinion of range that will be utilized in the remainder of the master plan.

This forecast effort was completed in March of 2015 with a base year of 2014.

These forecasts were approved by the FAA in May 2015. A copy of the approval letter is included in Appendix C. Due to an extended master plan review and approval process, the City Administration requested a more current set of activity statistics be included for reference. As a result, the activity statistics for calendar year 2018 have been included on the forecast summary, **Exhibit 2N,** later in this chapter to provide that updated reference.

TABLE 2A
2014 FAA Terminal Area Forecast
Albuquerque International Sunport

	2014	2020	2025	2030	2035	2040
ENPLANEMENTS						
Air Carrier	1,936,974	1,824,281	2,013,033	2,217,760	2,446,191	2,670,338
Commuter	458,504	591,086	652,125	712,662	783,852	849,592
Total Enplanements	**2,395,478**	**2,415,367**	**2,665,158**	**2,930,422**	**3,230,043**	**3,519,930**
ANNUAL OPERATIONS						
Itinerant						
Air Carrier	53,000	56,749	64,900	71,301	78,532	85,562
Air Taxi	28,177	26,910	24,664	25,917	27,238	28,632
General Aviation	27,750	28,578	29,592	30,641	31,725	32,850
Military	16,090	16,090	16,090	16,090	16,090	16,090
Total Itinerant	**125,017**	**128,327**	**135,246**	**143,949**	**153,585**	**163,134**
Local						
General Aviation	3,751	3,080	3,135	3,190	3,245	3,300
Military	2,836	2,836	2,836	2,836	2,836	2,836
Total Local	**6,587**	**5,916**	**5,971**	**6,026**	**6,081**	**6,136**
Total Operations	**131,604**	**134,243**	**141,217**	**149,975**	**159,666**	**169,270**
Based Aircraft	**174**	**196**	**218**	**243**	**268**	**297**

Source: FAA Terminal Area Forecast (Jan. 2015)

SUNPORT SERVICE AREA

The initial step in determining the aviation demand for an airport is to define its generalized service area for various segments of aviation. The service area is determined primarily by evaluating the location of competing airports, their capabilities, their services, and their relative attraction and convenience. In determining the aviation demand for an airport, it is necessary to identify the role of the airport, as well as the specific areas of aviation demand the airport is intended to serve. For the Sunport, the primary civilian roles are to accommodate commercial passenger airline service, as well as general aviation demand in the region. The Sunport also has a responsibility to accommodate a significant level of military activity as the runways are shared with Kirtland Air Force Base. However, it should be noted that this Master Plan will focus primarily on civilian demand.

The service area for an airport is a geographic region from which an airport can be expected to attract the largest share of its activity. The definition of the service area can then be used to identify other factors, such as socioeconomic and demographic trends, which influence aviation demand at an airport. Aviation demand will be impacted by the proximity of competing airports, the surface transportation network, and the strength of commercial airline and/or general aviation services provided by an airport and competing airports.

As in any business enterprise, the more attractive the facility is in terms of service and capabilities, the more competitive it will be in the market. If an airport's attractiveness increases in relation to nearby airports, so will the size of its service area. If facilities and services are adequate and/or competitive, some level of aviation activity might be attracted to an airport from more distant locales.

The service area of an airport is primarily defined by its proximity to other airports providing similar service. The Sunport's service area is rather extensive in that it is the only airport in the state of New Mexico with commercial service by the major airlines. Currently, there are seven other airports around the state that have some level of commercial service, but ABQ is the only one served by the major airlines as opposed to commuter/regional carriers. **Table 2B** shows the dominance of the Sunport in terms of enplanements in the state.

TABLE 2B
Passenger Service in New Mexico

City	ID	2014 Enplanements	Carrier(s)	Destinations
Albuquerque	ABQ	2,446,388	Multiple Major Airlines	Domestically
Santa Fe	SAF	74,551	American (Regional)	Dallas
			United Express	Denver, Los Angeles
Roswell	ROW	34,780	American (Regional)	Dallas
Hobbs	HOB	18,223	United Express	Houston
Farmington	FMN	5,670	Great Lakes	Denver, Alamosa CO, Phoenix, Show Low AZ
Carlsbad	CNM	1,756	New Mexico Air	ABQ (service discontinued in 2014)
Los Alamos	LAM	3,801	New Mexico Air	ABQ (service discontinued in 2014)
Clovis	CVN	1,952	BoutiqueAir	Dallas
Silver City	SVC	1,128	BoutiqueAir	ABQ (service initiated in 2014)

Source: US DOT - Bureau of Transportation Statistics

Approximately 95 percent of the commercial passengers enplaning in New Mexico do so at the Sunport. Since the Albuquerque metropolitan statistical area (MSA) comprises approximately 45 percent of the population in the state, it is obvious that the Sunport draws passengers from well beyond the metropolitan area.

El Paso International Airport is the next closest airport with major airline service. It is 224 miles south of ABQ. Amarillo and Lubbock are the next closest. They are located in west Texas, 278 and 289 miles respectively from the Sunport. Denver International Airport draws some traffic from northern New Mexico, and Phoenix Sky Harbor International Airport draws from the western New Mexico border.

Over the years, studies have shown that over two-thirds of the ABQ originating passengers come from within a thirty-mile radius of the Sunport. The next largest contributor has been the Santa Fe/Los Alamos area. Thus, the six-county area of Bernalillo, Sandoval, Valencia, Torrance, Los Alamos, and Santa Fe generates over 75 percent of the passengers at ABQ.

Santa Fe, which is 60 miles to the northeast of ABQ, has regional/commuter service to Dallas, Denver, and Los Angeles. Los Alamos had service to Albuquerque in 2014. In 2014, Santa Fe and Los Alamos airports totaled 78,352 enplanements. While commercial service to Santa Fe could be expected to increase in the future, the Sunport will continue to draw a significant portion of the potential enplanements from the area primarily because of the schedule frequency.

While Santa Fe and Los Alamos have been experiencing newfound passenger growth in recent years, in general, small communities have struggled to maintain air service under the current airline business models. Those that do maintain and grow their service will still not compare to the service levels at the Sunport. As a result, ABQ can expect to continue to draw passengers state-wide. Therefore, virtually the entire state, as well as portions of southern Colorado and eastern Arizona, can be considered part of the Sunport's secondary service area. The six-county area, however, remains the primary core of the commercial service market area. **Exhibit 2A** shows the primary commercial service and general aviation service area for the Sunport.

The general aviation service area is more localized due to the availability of other airports that serve general aviation exclusively. Therefore, the general aviation market area is limited to the MSA, and primarily to Bernalillo County. In fact, much of that market is shared with Double Eagle II, which is the City of Albuquerque's reliever airport and the only airport classified as a reliever New Mexico.

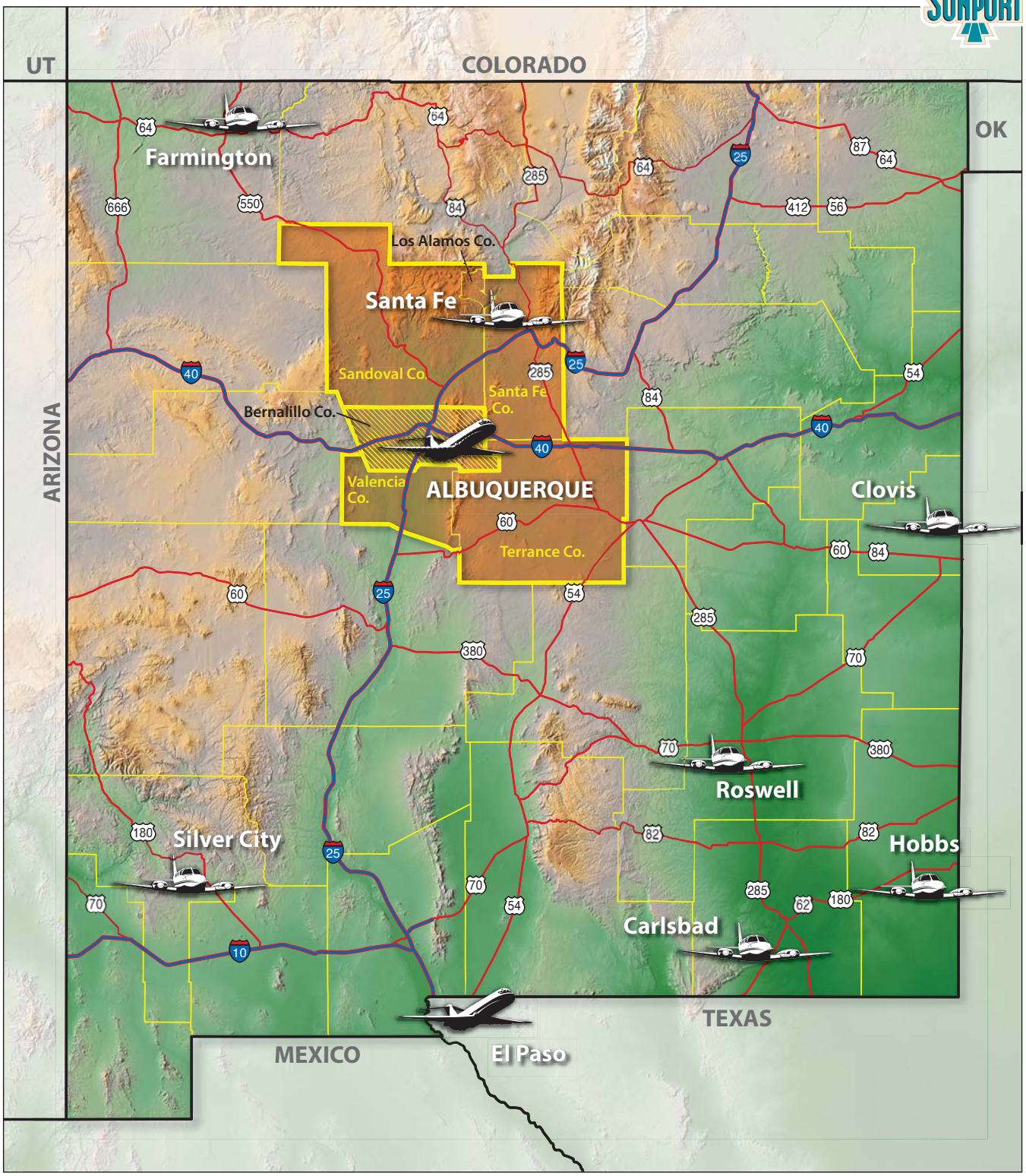
SOCIOECONOMIC TRENDS

Local and regional forecasts of key socioeconomic variables, such as population, employment, income, and gross regional product provide an indication of the potential for growth in aviation activities at an airport. **Exhibit 2B** summarizes the socioeconomic history and projections for the six-county primary commercial service area and the state of New Mexico.

Population in the six counties comprising the primary service area grew at an average annual rate of 2.27 percent between 1970 and 2000. Between 2000 and 2013, the rate slowed to an average of 1.52 percent. Population in the six-county region is forecast to grow from an estimate of 1,068,018 in 2013 to 1,498,294 in 2035, which is an annual growth rate of 1.55 percent. The state of New Mexico is forecast to grow 1.23 percent annually, suggesting that the forecast growth in the primary service area will be stronger than the state as a whole.

Employment in the primary service area grew at a 3.75 percent average rate between 1970 and 2000. Between 2000 and 2014, the average rate has been just 0.86 percent. After the recession in 2007-08, employment declined until 2011. Through 2013, employment had not reached the pre-recession level. Employment in the six-county region is forecast to average 1.78 percent annually through 2035, compared to 1.62 percent for the state.

Per capita personal income (PCPI) inflation-adjusted to 2009 dollars also dipped with the recession and has not regained the level at the start of the recession as of 2013. Inflation-adjusted PCPI is forecast to grow at an annual average of 1.52 percent for the MSA and 1.51 percent for the state through 2035.



LEGEND

- Major Airline Service
- Regional Airline Service (as of March 2015)
- Primary Air Service Area
- General Aviation Service Area

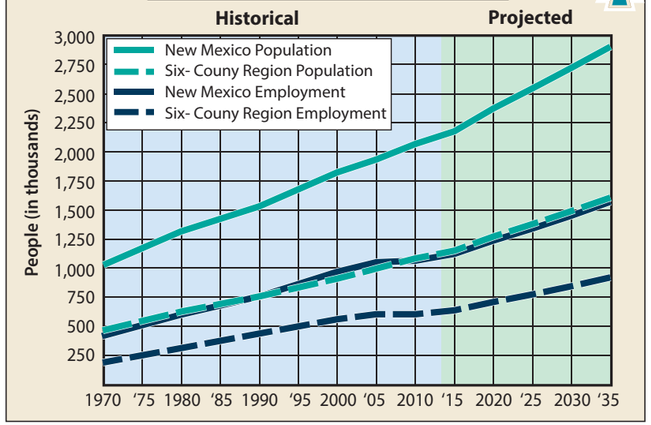
Exhibit 2A
AIRPORT SERVICE AREA

	Population		Employment		Income - PCPI ($2009)		Gross Regional Product ($millions)	
	New Mexico	Six-County Region[1]	New Mexico	Six-County Region[1]	New Mexico	Six-County Region[1]	New Mexico	Six-County Region[1]
YEAR								
1970	1,016,000	448,049	398,903	184,230	14,268	15,007	19,387	9,097
1980	1,302,894	616,064	597,035	300,256	18,948	19,837	34,940	16,245
1990	1,515,069	716,459	761,394	424,042	21,980	24,536	38,527	21,924
2000	1,819,046	877,284	964,673	556,091	27,363	31,622	60,502	37,165
AAGR 1970-2000	**1.96%**	**2.27%**	**2.99%**	**3.75%**	**2.19%**	**3.80%**	**5.86%**	**7.29%**
2001	1,831,690	890,599	968,930	557,461	29,211	33,370	61,460	37,549
2002	1,855,309	909,331	979,942	561,757	29,087	32,997	62,491	38,375
2003	1,877,574	925,749	999,282	571,124	29,278	32,874	66,123	39,936
2004	1,903,808	944,044	1,023,307	586,032	30,203	33,634	71,565	42,727
2005	1,932,274	965,568	1,046,746	599,306	31,044	34,306	73,448	43,253
2006	1,962,137	988,515	1,076,098	619,354	31,891	35,238	75,401	44,160
2007	1,990,070	1,008,132	1,100,590	632,079	32,622	35,508	76,578	44,190
2008	2,010,662	1,023,011	1,103,135	629,847	33,469	35,610	77,068	43,560
2009	2,036,802	1,037,395	1,071,162	608,976	32,201	34,210	75,308	44,133
2010	2,059,179	1,049,197	1,060,445	599,061	32,404	33,801	76,422	44,010
2011	2,077,919	1,060,474	1,065,888	599,211	32,794	33,972	76,432	43,621
2012	2,083,540	1,065,066	1,083,458	610,217	33,053	34,341	78,388	44,835
2013	2,085,287	1,068,018	1,101,300	621,397	33,391	34,689	80,395	46,082
2014[2]	2,127,499	1,095,598	1,119,388	632,752	33,767	35,142	92,713	47,363
AAGR 2000-2014	**1.06%**	**1.52%**	**1.00%**	**0.86%**	**1.41%**	**0.71%**	**2.89%**	**1.63%**
2020	2,351,724	1,244,558	1,233,809	704,759	36,545	37,983	95,986	55,831
2025	2,487,227	1,336,188	1,337,199	770,094	39,409	40,993	108,975	64,023
2030	2,613,332	1,421,666	1,448,470	840,619	42,701	44,456	123,751	73,408
2035	2,727,118	1,498,294	1,568,236	916,685	46,432	48,379	159,689	84,158
AAGR 2014-2035	**1.23%**	**1.55%**	**1.62%**	**1.78%**	**1.53%**	**1.53%**	**2.62%**	**2.78%**

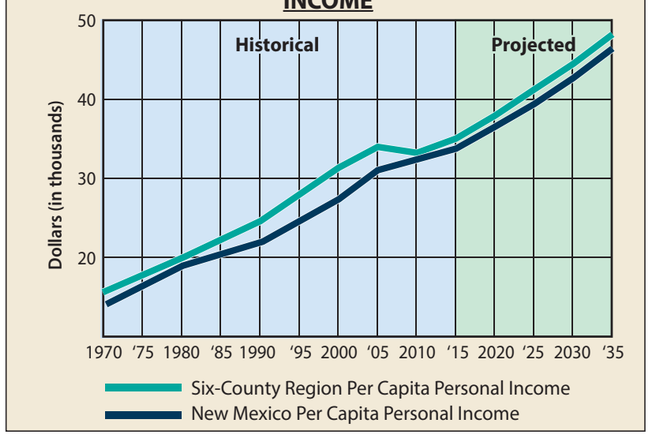
[1]Bernalillo, Sandoval, Torrance, Valencia, Santa Fe, Los Alamos Counties
[2]2014 Figures are an Interpolated estimate.
MSA: Metropolitan Statistical Area
PCPI - Per Capita Personal Income
AAGR: Average Annual Growth Rate

Source: Historical population from the U.S. Census Bureau, Population Division.
Source: Population projections from New Mexico County Population Projections July 1, 2010 to July 1, 2040, Geospatial and Population Studies Group, University of New Mexico. Released November 2012.
Source: Employment and Income from Woods & Poole Complete Economic and Demographic Data Source (CEEDS) 2014.

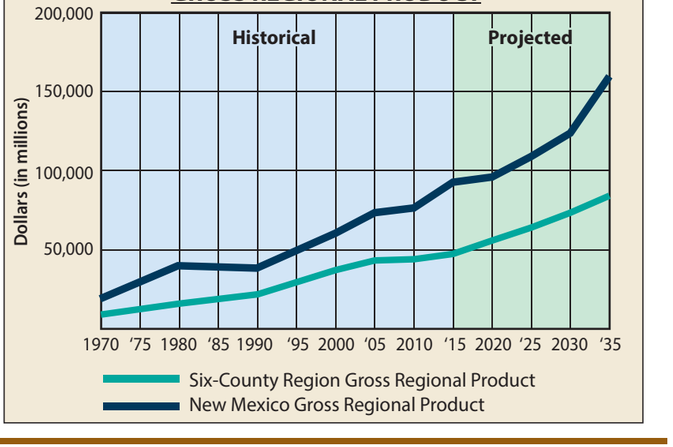
POPULATION AND EMPLOYMENT



INCOME



GROSS REGIONAL PRODUCT



This page intentionally left blank

Gross regional product (GRP) is similar to gross domestic product, but on a regional rather than national level. It is also adjusted for inflation to 2009 dollars. GRP dipped in 2009-10 as a result of the recession and has yet to regain its pre-recession level. GRP is forecast to grow an average of 2.79 percent annually through 2035 in the primary service area and 3.17 percent annually for the state as a whole.

NATIONAL AVIATION TRENDS

Each year, the FAA updates and publishes a national aviation forecast. Included in this publication are forecasts for the large air carriers, regional/commuter air carriers, general aviation, and FAA workload measures. The forecasts are prepared to meet budget and planning needs of the FAA and to provide information that can be used by state and local authorities, the aviation industry, and the general public. The current edition when this chapter was prepared was FAA *Aerospace Forecasts – Fiscal Years 2015-2035*, published in March 2015. The FAA primarily uses the economic performance of the United States as an indicator of future aviation industry growth. Similar economic analyses are applied to the outlook for aviation growth in international markets. The following discussion is summarized from the FAA Aerospace Forecasts.

Since its deregulation in 1978, the U.S. commercial air carrier industry has been characterized by boom-to-bust cycles. The volatility that was associated with these cycles was thought by many to be a structural feature of an industry that was capital intensive but cash poor. However, the great recession of 2007-09 marked a fundamental change in the operations and finances of U.S. airlines. Air carriers fine-tuned their business models to minimize losses by lowering operating costs, eliminating unprofitable routes, and grounding older, less fuel-efficient aircraft. To increase operating revenues, carriers initiated new services that customers were willing to purchase and started charging separately for services that were historically bundled in the price of a ticket. The industry experienced an unprecedented period of consolidation with four major mergers in five years. These changes along with capacity discipline exhibited by carriers have resulted in a fifth consecutive year of profitability for the industry in 2014. Looking ahead, there is optimism that the industry has been transformed from that of a boom-to-bust cycle to one of sustainable profits.

U.S. ECONOMIC OUTLOOK

According to the FAA forecast report, as the economy recovers from the most serious economic downturn and slow recovery since the Great Depression, aviation will continue to grow over the long run. Fundamentally, demand for aviation is driven by economic activity. As economic growth picks up, so will growth in aviation activity. The FAA forecast calls for passenger growth over the next 20 years to average 2.0 percent annually. The steep decline in the price of oil in 2014 and into 2015 is a catalyst for a short-lived uptick in passenger growth; however, growth is anticipated to be somewhat muted, primarily due to the uncertainty that surrounds the U.S. and global economies.

U.S. economic performance in 2014 continued to be mixed, with modest growth in real GDP and real incomes, a slowly falling unemployment rate, and oil prices and consumer inflation remaining in check. The economy grew at an average annual rate of 2.6 percent in fiscal year (FY) 2014 after expanding 1.8 percent in FY 2013. GDP growth was strong in the second half of 2014 after shrinking in the second quarter primarily due to adverse weather conditions spurred on by the polar vortex. There were favorable signs in 2014 as the housing market continued to improve, the stock market entered record territory, and the labor market saw steady improvement with almost 2.8 million new jobs created during the year, the best figure since 1999. The unemployment rate fell steadily throughout 2014 from 7.2 percent to 5.6 percent by December.

In the medium term, (the three-year period between 2016 and 2019), U.S. economic growth is projected to average 2.6 percent per year with rates ranging between 2.4 and 2.7 percent. Income growth picks up during the same period, averaging 3.2 percent per year. For the balance of the forecast period, annual average growth of U.S. real GDP and real income slow to around 2.4 and 2.5 percent, respectively. The long-term stability of U.S. economic growth depends on sustained growth in the workforce and capital stock, along with improved productivity and competitiveness.

U.S. TRAVEL DEMAND

By year end of federal FY 2014, the U.S. commercial aviation industry consisted of 16 scheduled mainline air carriers that used large passenger jets (over 90 seats) and 70 regional carriers that used smaller piston, turboprop, and regional jet aircraft (up to 90 seats) to provide connecting passengers to the larger carriers. Mainline and regional carriers offer domestic and international passenger service between the U.S. and foreign destinations, although regional carrier international service is confined to the border markets in Canada, Mexico, and the Caribbean. Twenty-six all-cargo carriers were providing domestic and/or international air cargo service at the end of 2014.

According to FAA, shaping today's commercial air carrier industry are three distinct trends: (1) continuing industry consolidation and restructuring; (2) continued capacity discipline in response to external shocks; and (3) the proliferation of ancillary revenues.

The restructuring and consolidation of the U.S. airline industry that began in the aftermath of the terror attacks of September 11, 2001, continued in 2014. During 2014, Southwest continued to integrate the former AirTran network into its operations, while American and U.S. Airways moved ahead with combining their networks and reservation systems. Consequently, when compared to 2007, 5.7 percent fewer domestic available seat miles (ASMs) were flown and 2.9 percent fewer passengers were carried domestically in 2014. This has had clear implications with both the average size of aircraft and load factors increasing.

One of the most striking outcomes of industry restructuring has been the unprecedented period of capacity discipline (achieving higher passenger loads through scheduled flight and fleet mix consolidation primarily), especially in domestic markets. Between 1978 and 2000, ASMs in domestic markets increased

at an average annual rate of four percent per year, recording only two years of decline. Even though domestic ASMs shrank by 6.9 percent in FY 2002, following the events of September 11, 2001, growth resumed and by FY 2007, domestic ASMs were 3.6 percent above the FY 2000 level. However, since FY 2007, ASMs in the U.S. domestic market have decreased by 5.7 percent, as the industry responded first to the sharp rise in oil prices (up 155 percent between 2004 and 2008) and then the Great Recession that followed (2008-2009).

The 5.7 percent reduction in domestic capacity since 2007 has not been shared equally between the mainline carriers and their regional counterparts. To better match demand to capacity, the mainline carriers contracted out "thin" routes to their regional counterparts because they could provide lift at a lower cost, or simply removed the capacity altogether. In 2014, the mainline carrier group provided 6.3 percent less capacity than it did in 2007 (and carried 3.6 percent fewer passengers). Capacity flown by the regional group has shrunk by 1.9 percent over the same five-year period (with passengers carried decreasing by 0.7 percent).

The most recent trend to take hold is that of ancillary revenues. Carriers generate ancillary revenues by selling products and services beyond that of an airplane ticket to customers. This includes the un-bundling of services previously included in the ticket price, such as checked bags and on-board meals, and by adding new services, such as boarding priority. As a result of capacity reduction and the introduction of ancillary revenue sources, U.S. passenger carriers posted net profits for the fifth consecutive year in 2014.

Factors Affecting Local Travel Demand

Many factors will influence travelers' decisions for travel. When there are multiple commercial service airports within a reasonable driving distance, airports may experience "leakage" of passengers to other airports. Other factors such as flight schedules, airfares, non-stop service destinations, parking availability, and services available will also influence a traveler's decision. Another factor is the surface transportation system. For some, it might be worthwhile to drive to a destination rather than fly.

The Albuquerque metropolitan area is the largest population center in the state and the Sunport is by far the busiest commercial service airport offering the greatest level of service. There are approximately 1.57 million people living within a four-hour drive time of the Sunport, which is approximately 76 percent of the state's population. Leakage to other airports is not a significant issue for the Sunport.

Another major factor at the Sunport has been the Wright Amendment. Key to the development of Dallas-Ft. Worth International Airport was an agreement by the airlines to move their operations to the new airport from Love Field and Ft. Worth's Meacham Airport. Southwest Airlines was not founded until after the agreement, before the opening of DFW in 1974. The airline's original business

Another major factor at the Sunport has been the Wright Amendment.

model was for intrastate service in the regulated airline environment, and it felt that having to drive to DFW would seriously affect that model.

With the Airline Deregulation Act of 1979, interstate opportunities for a low-cost airline such as Southwest and other start-ups grew. The Wright Amendment of 1979 was a federal law that primarily intended to limit both non-stop and direct flights into and out of Dallas Love Field to destinations within Texas and neighboring states. As Southwest expanded its service across the country and grew into one of the nation's largest airlines, airports such as the Sunport that were located within the "Wright Zone" essentially became mini hubs for service into and out of Love Field. Since direct flights were not allowed, passengers would fly into ABQ, deplane, then enplane on another ticket to their intended destination. As a result, ABQ and similar Wright Zone airports gained enplanements.

In 1997, an amendment was passed adding Kansas, Mississippi, and Alabama to the permissible "Wright Zone." This had little effect as Southwest did not begin service in any of those states until recent years. In 2005, the state of Missouri was added by amendment, opening non-stop flights from Love Field to Kansas City and St. Louis.

In 2006, a compromise was reached capping the number of airline gates at Love Field to 20. Under the agreement, the ban on direct flights was lifted immediately, and the full Wright Amendment was set to sunset on October 16, 2014. This reduced the number of enplanements at ABQ as passengers could stay on their original flight. There was, however, still connecting passengers between those flights. More on the effects of the Wright Amendment will be discussed in later sections.

FORECASTING APPROACH

The development of aviation forecasts proceeds through both analytical and judgmental processes.

The development of aviation forecasts proceeds through both analytical and judgmental processes. A series of mathematical relationships is tested to establish statistical logic and rationale for projected growth. However, the judgment of the forecast analyst, based upon professional experience, knowledge of the aviation industry, and assessment of the local situation, is important in the final determination of the preferred forecast.

The most reliable approach to estimating aviation demand is through the utilization of more than one analytical technique. Methodologies frequently considered in the aviation industry include trend line projections, correlation/regression analysis, and market share analysis. By developing several projections for each aviation demand indicator, a reasonable planning envelope will emerge. The selected forecast may be one of the individual projections or a combination of several projections based on local conditions. The selected forecast will almost always fall within the planning envelope. Some combination of the following forecasting techniques is utilized to develop the planning envelope for each demand indicator.

Trend line projections are probably the simplest and most familiar of the forecasting techniques. By fitting growth curves to historical demand data, then extending them into the future, a basic trend line

projection is produced. A basic assumption of this technique is that outside factors will continue to affect aviation demand in much the same manner as in the past. As broad as this assumption may be, the trend line projection does serve as a reliable benchmark for comparing other projections.

Correlation analysis provides a measure of the direct relationship between two separate sets of historic data. Should there be a reasonable correlation between the data, further evaluation using regression analysis may be employed.

Regression analysis measures the statistical relationship between dependent and independent variables, yielding a "correlation coefficient." The correlation coefficient (Pearson's "r") measures associations between the changes in a dependent variable and independent variable(s). If the r-squared (r^2) value (coefficient determination) is greater than 0.90, it indicates good predictive reliability. A value below 0.90 may be used with the understanding that the predictive reliability is lower.

Market share analysis involves a historical review of aviation activity as a percentage, or share, of a larger regional, state, or national aviation market. A historical market share trend is determined providing an expected market share for the future. These shares are then multiplied by the forecasts of the larger geographical area to produce a market share projection. This method has the same limitations as a trend line projection but can provide a useful check on the validity of other forecasting techniques.

It is important to note that forecasts will age, and the farther a forecast is from the base year, the less reliable it may become, particularly due to changing local and national conditions. Nonetheless, the FAA indicates that a Master Plan include a 20-year forecast for the airport. Facility and financial planning usually require at least a 10-year view, since it often takes more than five years to complete a major facility development program. However, it is important to use forecasts which do not overestimate revenue-generating capabilities or understate demand for facilities needed to meet public (user) needs.

A wide range of factors is known to influence the aviation industry and can have significant impacts on the extent and nature of air service provided in both the local and national markets. Technological advances in aviation have historically altered, and will continue to change, the growth rates in aviation demand over time. The most obvious example is the impact of jet aircraft on the aviation industry, which resulted in a growth rate that far exceeded expectations. Such changes are difficult, if not impossible, to predict, and there is simply no mathematical way to estimate their impacts.

Using a broad spectrum of local, regional, and national socioeconomic and aviation information and analyzing the most current aviation trends, forecasts are presented for the following demand indicators:

COMMERCIAL PASSENGER SERVICE
- Annual Enplaned Passengers
- Operations and Fleet Mix

COMMERCIAL AIR CARGO
- Enplaned Tons

AIR TAXI AND MILITARY
- Local and Itinerant Operations

GENERAL AVIATION
- Based Aircraft
- Based Aircraft Fleet Mix
- Local and Itinerant Operations

PEAKING CHARACTERISTICS
- Airline Enplanement Peaks
- Operations Peak

COMMERCIAL PASSENGER SERVICE FORECASTS

To evaluate commercial service potential at the Sunport and the facilities necessary to properly accommodate present and future airline activity, two basic elements must be forecast: annual enplaned passengers and annual airline operations. Annual enplaned passengers serve as the most basic indicator of demand for commercial passenger service activity. The combination of enplanements and deplanements generally equals the total passengers using an airport. The annual number of enplanements is the figure utilized by the FAA to determine various entitlement funding levels for commercial service airports.

The term "enplanement" refers to a passenger boarding an airline flight. Enplaning passengers are then described in terms of either "originating" or "connecting/transferring." Originating passengers depart from a specific airport for a destination or hub airport to connect/transfer to another flight. Connecting/transferring passengers are those who have departed from another location and are using the airport as an intermediate stop. These passengers may disembark their originating flight to wait in the terminal for their next flight or could simply remain on the aircraft at an intermediary stop as a "through" passenger. Albuquerque International Sunport and similar airports tend to have mostly originating passengers, while larger hubs like those in Dallas, Denver, or Phoenix could have a more significant percentage of passengers who are connecting/transferring.

As indicated earlier, an important resource utilized in aviation demand forecasting is the annual FAA aviation forecasts. The most recent available version is the *FAA Aerospace Forecasts – Fiscal Years 2015-2035*, published in March 2015. The FAA forecasts a variety of aviation demand indicators on an annual basis. In the most current edition, fiscal year 2013 is presented as the baseline, with 2014 showing as an estimate and years 2015 through 2035 as projections. Many forecasting elements utilized in this analysis will consider the history and projections presented by the FAA in its annual forecast.

An important resource utilized in aviation demand forecasting is the annual FAA aviation forecasts.

FAA COMMERCIAL AIR CARRIER FORECASTS

Although the recession has been officially over for several years, in 2014 carriers continued to deal with economic uncertainties as business travel budgets remained strained, unemployment was still relatively high compared to pre-recession years, and uncertainty surrounding federal fiscal policy remained. In such an unstable but slowly improving economic environment, industry capacity growth was somewhat restrained (up 2.2 percent in 2014), after only a 0.8 percent increase in 2013. Given the minimal increase in seats available to the traveling public, carriers were still able to raise airfares despite the slow growth in demand. Higher airfares and ancillary revenue, coupled with flat to falling fuel prices, resulted in U.S. carriers being profitable in 2014.

According to the FAA, system capacity is projected to increase modestly (up 2.4 percent) in 2015. In the domestic market, mainline carrier capacity expanded only slightly (1.8 percent) in 2014 but is projected to grow at a more robust rate (2.6 percent) in 2015, while capacity for the regional carriers is projected to post its first increase since FY 2011 (up 4.0 percent). In the international sector, capacity is forecast

to increase slowly in the Atlantic and Pacific markets and increase modestly in the Latin market, resulting in an overall international capacity increase of 1.6 percent in 2015.

Passenger demand growth is in line with capacity growth in 2015, with system revenue passenger miles (RPMs) forecast to grow 2.6 percent. Supported by a growing U.S. and world economy, year over year RPM growth is forecast to be 2.5 percent on average over the period from 2015-2035. Over the same time period, system capacity growth averages 2.5 percent per year.

System passengers are projected to increase an average of 1.9 percent a year, with mainline carriers growing at 2.0 percent a year, slightly higher than their regional counterparts (up 1.6 percent). By 2035, U.S. commercial air carriers are projected to fly 1.71 trillion ASMs and transport 1.14 billion enplaned passengers – a total of 1.44 trillion passenger miles.

Over the forecast period, domestic enplanements are projected to grow at an average annual rate of 1.7 percent.

Planes will remain crowded, with load factors projected to grow moderately during the early years of the forecast period, then tapering during the mid to latter years to 84.2 percent in 2035 (up 0.6 points compared to the beginning of the forecast period in 2015).

The FAA forecasts indicate that enplanements are forecast to grow (up 2.6 percent) in 2015, following a 2.1 percent increase in 2014. Over the forecast period, domestic enplanements are projected to grow at an average annual rate of 1.7 percent, with mainline and regional carriers growing at the same rate. **Exhibit 2C** presents the annual historical and forecast enplanement totals for both large air carriers and commuter airlines in the U.S. as forecast by the FAA.

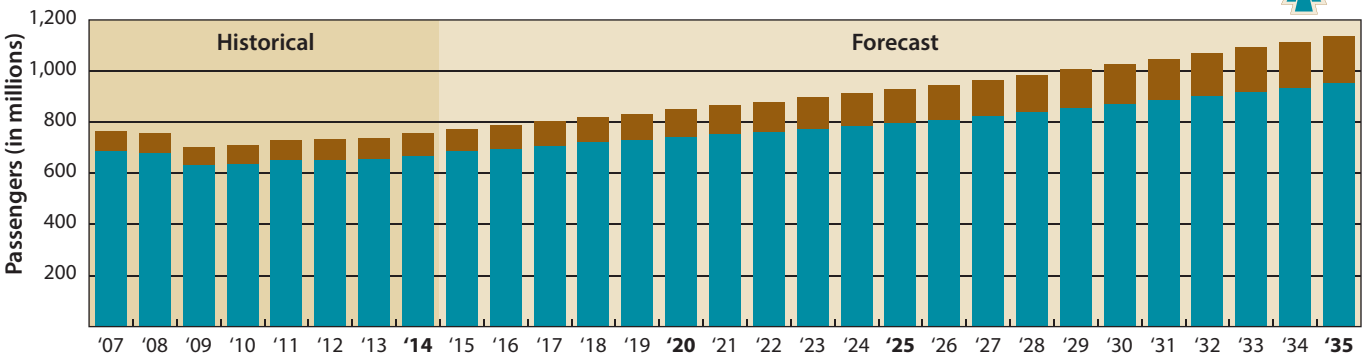
FAA COMMERCIAL AIRCRAFT FLEET FORECAST

The commercial passenger carrier fleet is undergoing transformation. The mainline carriers are retiring older, less fuel-efficient aircraft (e.g., 737-300/400/500, 757/767, and MD-80) and replacing them with more technologically advanced A319/320 and 737-700/800/900 aircraft. The regional carriers are growing their fleet of 70-90 seat regional jet aircraft and reducing their fleet of 50-seat jet aircraft. The total number of aircraft in the U.S. commercial fleet (including regional carriers) is estimated at 6,727 for 2014, a decrease of 86 aircraft from 2013. This total includes 3,774 mainline air carrier passenger aircraft (over 90 seats), 740 mainline air cargo aircraft, and 2,213 regional carrier aircraft (jets, turboprops, and pistons).

The number of passenger jets in the mainline fleet is estimated to have increased by 41 in 2014. After 2014, the mainline aircraft fleet was projected to add approximately 64 aircraft annually, totaling 5,112 aircraft in 2035. The mainline narrow-body fleet (including the Embraer 190s) was projected to grow by 42 aircraft annually from 2015-2035. The wide-body fleet (including the Boeing 787 and Airbus A-350) was projected to grow by 24 aircraft annually over the same period. Mainline passenger jet aircraft are forecast to increase 1.5 percent annually through 2034.

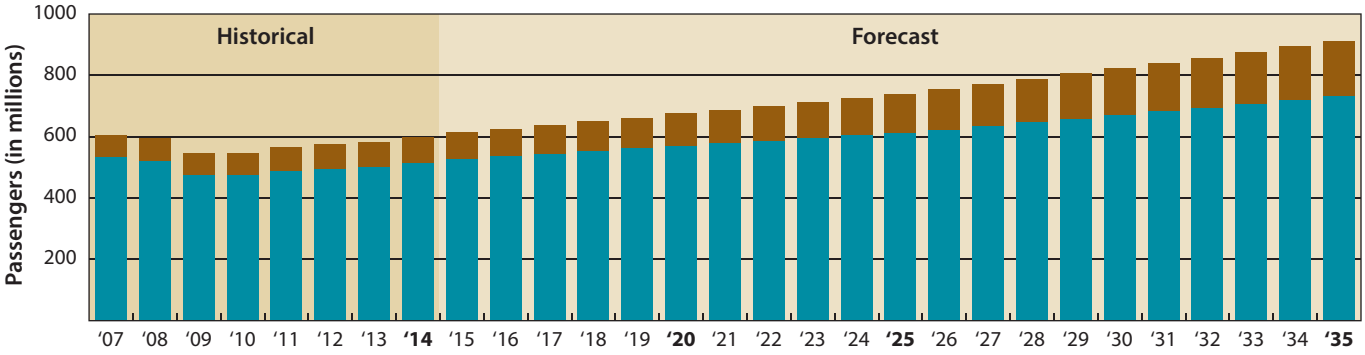
Mainline passenger jet aircraft are forecast to increase 1.5 percent annually through 2034.

U.S. AIR CARRIER PASSENGER ENPLANEMENTS[1]



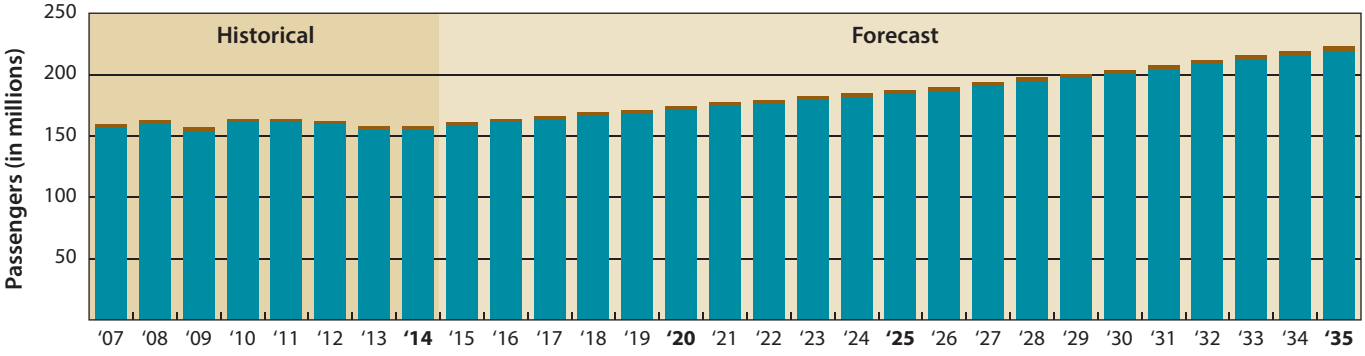
SOURCE	2014	2020	2025	2035	AAGR 2014-2035
Domestic Revenue Enplanements	668.4	742.0	796.6	951.0	1.69%
International Revenue Enplanements	88.0	109.1	130.8	185.5	3.61%
TOTAL	756.3	851.1	927.4	1,136.5	1.96%

U.S. MAINLINE AIR CARRIER PASSENGER ENPLANEMENTS



SOURCE	2014	2020	2025	2035	AAGR 2014-2035
Domestic Revenue Enplanements	513.2	570.5	612.7	731.7	1.70%
International Revenue Enplanements	85.1	105.9	127.4	181.4	3.67%
TOTAL	598.3	676.4	740.2	913.1	2.03%

U.S. REGIONAL AIR CARRIER PASSENGER ENPLANEMENTS



SOURCE	2014	2020	2025	2035	AAGR 2014-2035
Domestic Revenue Enplanements	155.2	171.5	183.9	219.3	1.66%
International Revenue Enplanements	2.9	3.2	3.4	4.0	1.54%
TOTAL	158.1	174.6	187.3	223.3	1.66%

[1]Sum of U.S. Mainline and Regional Air Carrier Enplanements

Source: FAA Aerospace Forecast - Fiscal Years 2015-2035

Note: All figures measured in millions

The regional passenger aircraft fleet is estimated to have decreased by 86 aircraft in 2014, as decreases in 50-seat and smaller regional jets and turboprops outpace production of new larger regional jets. After 2014, the regional carrier fleet (turboprops and jets) is expected to decrease by 0.2 percent per year over the remaining years of the forecast period, totaling 2,141 aircraft in 2035. The number of regional jets (90 seats or fewer) is projected to grow from 1,642 in 2014 to 1,953 in 2034, an average annual increase of 0.8 percent. All the growth in regional jets over the forecast period occurs in the larger, 70- to 90-seat aircraft category. During the forecast period, all regional jets of 50 or fewer seats are projected to be retired from the fleet.

Large cargo jet aircraft are forecast to grow from an estimate of 740 in 2014 to a total 1,182 aircraft in 2035. The narrow-body, cargo jet fleet is projected to increase by two aircraft per year over the 20-year forecast period as older 757s and 737s are converted to cargo service. The wide-body, cargo jet fleet is projected to increase by 14 aircraft annually. **Exhibit 2D** presents the FAA commercial aircraft fleet forecast through 2025.

HISTORICAL COMMERCIAL PASSENGER ACTIVITY

Table 2C provides a history of passenger enplanements at the Sunport since 1980. Over the past 34 years, the Sunport has seen its passenger activity grow from 1,149,664 in 1980, to an all-time high of 3,346,639 in 2007. Since 2007, annual enplanements have declined annually, primarily due to the national recession from 2007-2009, the relatively slow recovery, and the repeal of the Wright Amendment. The annual growth rate over that 34-year period averaged 2.25 percent, but the table shows how traffic has fluctuated annually.

TABLE 2C
Historic Passenger Enplanements
Albuquerque International Sunport

Year	Annual Enplaned	% Change Year over Year
2014	2,446,388	-3.89%
2013	2,545,286	-5.88%
2012	2,704,305	-5.51%
2011	2,861,945	-1.79%
2010	2,914,129	-1.51%
2009	2,958,903	-9.15%
2008	3,256,793	-2.68%
2007	3,346,639	2.61%
2006	3,261,463	0.52%
2005	3,244,646	2.32%
2004	3,171,185	4.24%
2003	3,042,174	-0.68%
2002	3,063,036	-0.80%
2001	3,087,703	-1.86%
2000	3,146,208	0.46%
1999	3,131,951	2.03%
1998	3,069,629	-2.20%
1997	3,138,663	-5.12%
1996	3,308,048	7.96%
1995	3,064,069	-0.45%
1994	3,077,974	9.63%
1993	2,807,489	6.76%
1992	2,629,792	6.84%
1991	2,461,434	-1.21%
1990	2,491,702	5.47%
1989	2,362,570	10.16%
1988	2,144,678	0.15%
1987	2,141,538	3.65%
1986	2,066,129	7.60%
1985	1,920,113	11.51%
1984	1,721,869	16.93%
1983	1,472,570	19.78%
1982	1,229,446	13.45%
1981	1,083,733	-5.73%
1980	1,149,664	-7.25%

Source: Airport records

Since 1980, year-over-year enplanements have declined 16 times and increased 18 times. A drop of 9.15 percent in 2009 was the largest single-year decline. The largest single-year increase of 19.78 percent occurred in 1983.

Enplanement levels at airports often correspond to the state of the national economy. Enplanement levels at the Sunport have generally followed this trend. In the early 1980s, the economy was in the middle of a recession and enplanement levels declined. From 1983 through 1990, the Sunport had nine

consecutive years of enplanement growth. In 1991, enplanement levels declined at a time of a mild economic recession. From 1992 through 1994, the Sunport saw three consecutive growth years, including reaching over three million enplanements for the first time in 1994.

The enplanement levels at the Sunport remained relatively steady at around three million from 1994 through 2003. This was a period of economic growth, followed by a mild recession, culminating with the terrorist attacks on September 11, 2001. From 2004 through 2007, the Sunport had four consecutive years of growth.

In 2008, the nation entered the Great Recession which lasted more than a year with a historically slow recovery following. While airline restructuring and consolidation continued through this time, this recession brought about even more capacity discipline from airlines. That, coupled with the Wright Amendment compromise in 2006, had an effect at the Sunport. Since 2008, Sunport enplanements have declined every year through 2014. At the end of 2014, the total enplanements dipped below 2.5 million for the first time since 1991.

Enplanements by Airline

Table 2D presents annual enplanements by airline for 2006, 2010, and 2014. Southwest Airlines has been the dominant carrier at the Sunport, currently accounting for 57 percent of total enplanements in 2014. American Airlines has consistently been second, accounting for 20.9 percent in 2014. Delta was next in 2014 with 10.5 percent, followed by United with 9.3 percent of enplanements. In 2013, American was acquired by U.S. Airways and the airline took the name of its acquisition. As of March 2015, some flights were still branded as U.S. Airways. Ultimately, all U.S. Airways flights will be operated under American Airlines.

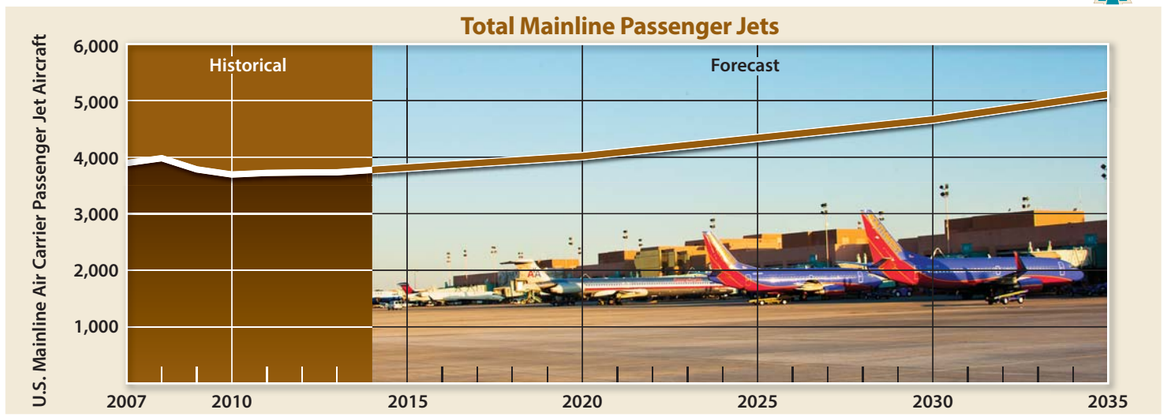
TABLE 2D
Passenger Enplanements by Airline
Albuquerque International Sunport

	2006	%	2010	%	2014	%
MAINLINE/REGIONAL CARRIERS						
Alaska Air	-	-	-	-	11,673	0.5%
American Airlines[1]	607,992	19.2%	506,026	17.4%	510,246	20.9%
Delta Air Lines[2]	308,760	9.8%	315,161	10.8%	257,523	10.5%
Frontier Airlines/Horizon	92,934	2.9%	104,631	3.6%	827	0.0%
jetBlue Airways	-	-	-	-	37,923	1.6%
Southwest Airlines	1,681,206	53.2%	1,643,286	56.4%	1,394,358	57.0%
United Airlines[3]	442,199	14.0%	214,666	7.4%	227,018	9.3%
TOTAL	**3,133,091**	**99.1%**	**2,783,770**	**95.5%**	**2,439,568**	**99.7%**
COMMUTER CARRIERS						
Great Lakes Airlines	4,693	0.1%	4,183	0.1%	-	-
Mesa Airlines	24,407	0.8%	-	-	-	-
Pacific Wings/NM Airlines	-	-	3,235	0.1%	4,651	0.2%
Other[4]	-	-	122,941	4.2%	2169	0.1%
TOTAL	**29,100**	**0.9%**	**130,359**	**4.5%**	**6,820**	**0.3%**
TOTAL COMBINED	**3,162,191**	**100.0%**	**2,914,129**	**100.0%**	**2,446,388**	**100.0%**

[1]American Airlines and U.S. Airways have merged and will go forward as American Airlines.
[2]Delta figures include Northwest and Northwest regionals operating until acquired then discontinued in 2010.
[3]United merged with Continental and figures include Continental Express Airlines which operated through 2012.
[4]Includes Skywest, Express Jet, Westward Airways, Chautauqua Airlines, Allegiant, Sun Country, Republic, & Xtra.

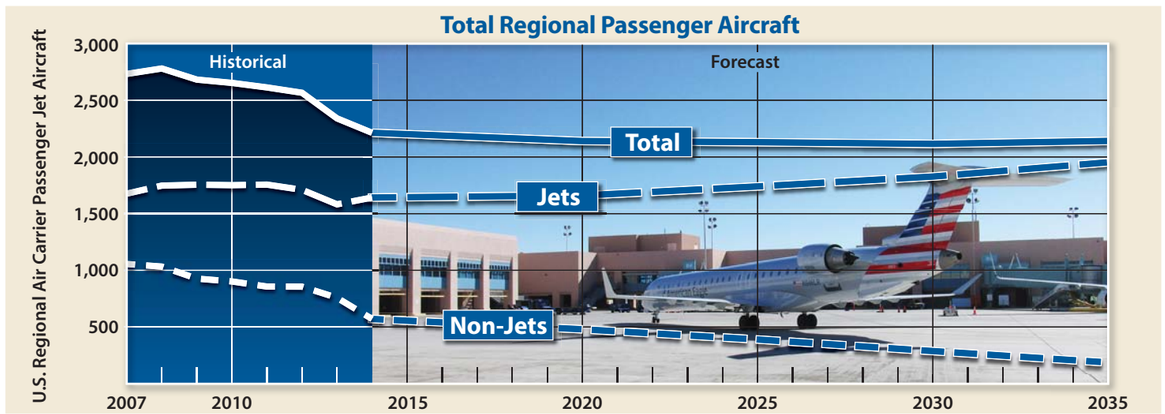
U.S. MAINLINE AIR CARRIER PASSENGER JET AIRCRAFT

	2014	2020	2025	2035	AAGR 2014-2035
Large Narrow Body					
2 Engine	3,155	3,291	3,512	4,016	1.16%
3/4 Engine	5	5	0	0	0.00%
Large Wide Body					
2 Engine	481	594	731	983	3.46%
3/4 Wide Body	40	31	0	0	0.00%
Total Large Jets	**3,681**	**3,921**	**4,243**	**4,999**	**1.47%**
Total Regional Jets	**93**	**97**	**97**	**113**	**0.93%**
Total Mainline Passenger Jets	**3,774**	**4,018**	**4,340**	**5,112**	**1.46%**



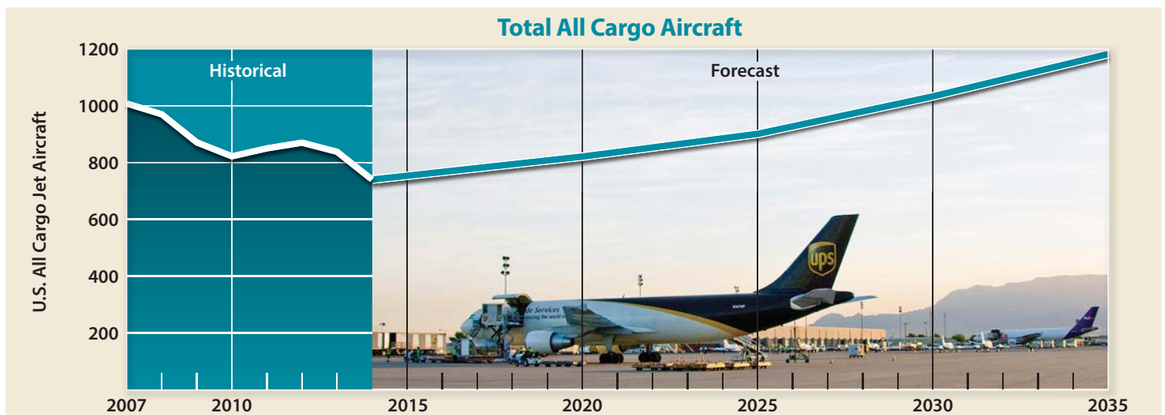
U.S. REGIONAL AIR CARRIER PASSENGER JET AIRCRAFT

	2014	2020	2025	2035	AAGR 2014-2035
Less than 30 Seats					
Turboprop	483	388	293	79	-8.26%
31-40 Seats					
Turboprop	37	30	22	6	-8.30%
Over 40 Seats					
Turboprop	51	62	75	103	3.40%
Jet	1,642	1,660	1,740	1,953	0.83%
Non-Jet Total	**571**	**480**	**390**	**188**	**-5.15%**
Jet Total	**1,642**	**1,660**	**1,740**	**1,953**	**0.83%**
Total Regional Passenger Aircraft	**2,213**	**2,140**	**2,130**	**2,141**	**-0.16%**



U.S. ALL CARGO JET AIRCRAFT

	2014	2020	2025	2035	AAGR 2014-2035
Large Narrow Body					
2 Engine	191	213	243	306	2.27%
3/4 Engine	15	13	0	0	0.00%
Large Wide Body					
2 Engine	296	356	439	628	3.65%
3/4 Engine	238	239	219	248	0.20%
Total All Cargo Jets	**740**	**821**	**901**	**1,182**	**2.26%**



Source: FAA Aerospace Foreast - Fiscal Years 2015-2035

This page intentionally left blank

A variety of commuter airline operators have served the Sunport. Those regional airlines that operate under the umbrella of a larger airline are included in the enplanement figures for the parent airline. In December of 2014, Pacific Wings/New Mexico Airlines, which provided service between Albuquerque and several other in-state airports, significantly reduced operations. In the first quarter of 2015, Boutique Air began service to Silver City. **Exhibit 2E** shows the historical enplanements by airline since 2006.

Top 20 Origin and Destination Markets

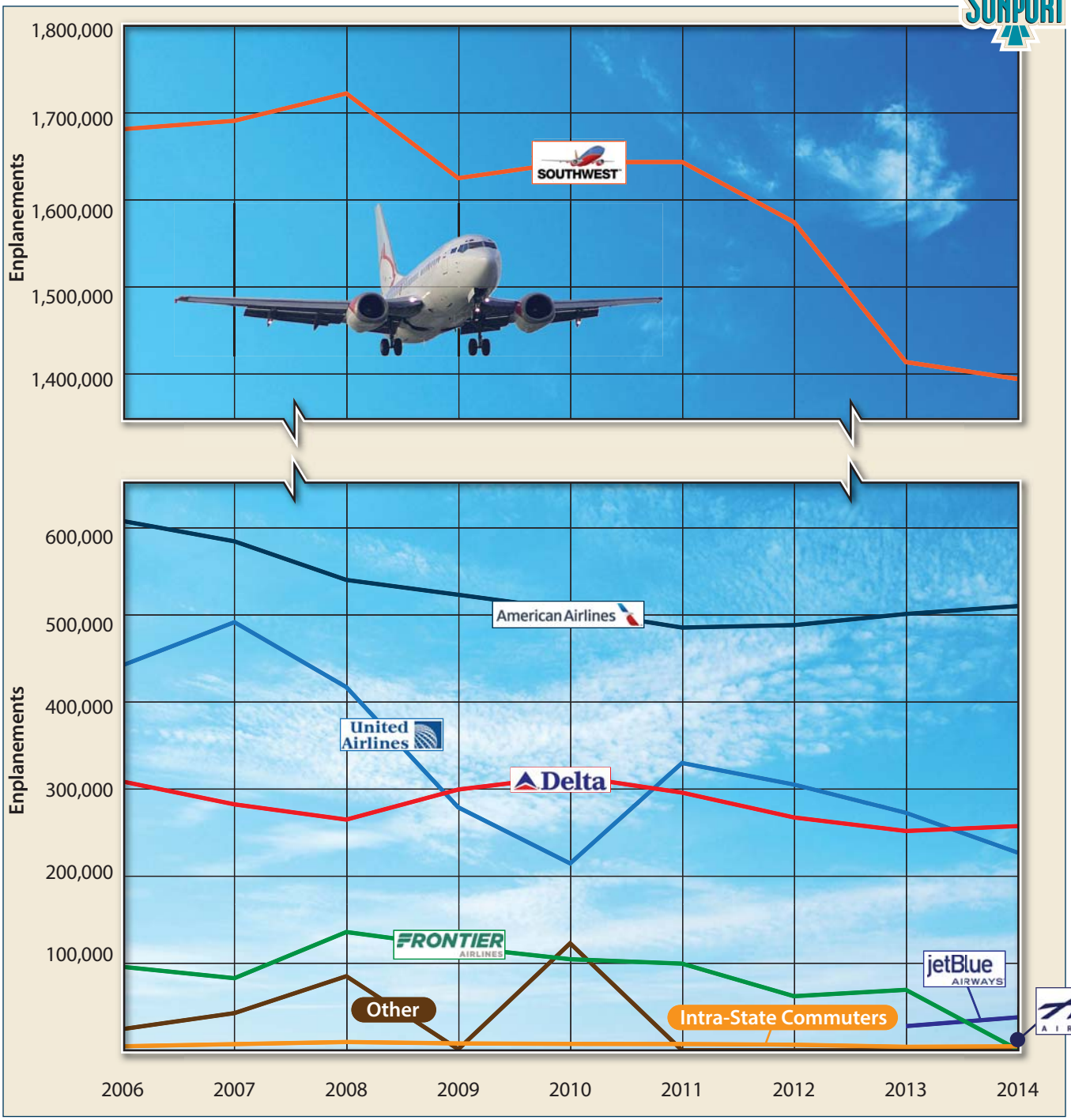
The U.S. Department of Transportation (DOT) maintains a rolling quarterly survey of 10 percent of all airline tickets sold for each commercial service airport. This Origin & Destination (O&D) Survey provides information on passengers' starting and ending cities and shows the volume of traffic between city pairs. The figures do not include "through" (connecting/transfer) passengers.

Information obtained from the O&D Survey provides final destinations for those traveling from the Sunport. Origin and destination data is typically useful in examining the strength of the local market to and from other markets. **Table 2E** shows the top 20 markets for 2004, 2009, and the 12-month period ending September 2014.

TABLE 2E
Top Twenty Destination Markets
Albuquerque International Sunport

Rank	Destination	2004	Destination	2009	Destination	2014
1	Phoenix	246,720	Los Angeles Area	183,750	Los Angeles Area	157,880
2	Los Angeles Area	197,770	Phoenix	183,360	Phoenix	154,320
3	Dallas Area	157,780	Dallas Area	144,160	San Francisco Bay Area	129,620
4	Washington D.C. Area	138,720	San Francisco Bay Area	136,190	Dallas Area	124,320
5	San Francisco Bay Area	132,770	Washington D.C. Area	131,160	Washington D.C. Area	109,960
6	Las Vegas	114,890	Denver	127,980	Las Vegas	109,270
7	Chicago Area	82,780	Las Vegas	108,650	New York Area	92,320
8	Houston Area	76,730	New York Area	85,730	Denver	87,170
9	New York Area	76,270	Chicago Area	83,380	Houston Area	72,250
10	San Diego	69,450	Houston Area	82,630	Chicago Area	63,790
11	Denver	67,430	San Diego	65,670	Seattle	63,360
12	Seattle	58,060	Seattle	61,780	San Diego	63,000
13	Orlando	49,770	Orlando	47,460	Portland	43,750
14	Atlanta	41,000	Portland	44,310	Boston	35,150
15	Portland	40,530	Salt Lake City	37,900	Atlanta	34,880
16	Minneapolis/St. Paul	35,640	Minneapolis/St. Paul	37,320	Orlando	34,630
17	Austin	34,460	Austin	36,870	Salt Lake City	33,270
18	Kansas City	33,350	San Antonio	36,010	Austin	31,470
19	Tucson	35,710	Philadelphia	34,820	Minneapolis/St. Paul	26,520
20	San Antonio	32,770	Tucson	33,130	Kansas City	26,270
Top 20 Total		1,722,600		1,702,260		1,493,200
Total Originations		2,547,510		2,511,400		2,108,010
Total Enplanements (T-100)		3,078,463		2,880,914		2,382,511
% Originations		82.75%		87.17%		88.48%

Source: USDOT - Bureau of Transportation Statistics, Origin-Destination Survey of Airline Passenger Traffic; T-100 Market Enplaned Passengers



LEGEND

- Alaska Air/Horizon Air
- American Airlines[1]
- Delta Air Lines[2]
- Frontier Airlines
- JetBlue Airways
- Southwest Airlines
- United Airlines[3]
- Intra-State Commuters[4]
- Other[5]

[1]American Airlines and U.S. Airways have merged and will go forward as American Airlines
[2]Delta figures include Northwest and Northwest regionals operating until acquired then discontinued in 2010
[3]United merged with Continental and figures include Continental Express Airlines which operated through 2012
[4]Great Lakes, New Mexico Airlines
[5]Includes Mesa, Skywest, Express Jet, Westward, Chautauqua, Allegiant, Sun Country, Republic, & Xtra.

Exhibit 2E
HISTORICAL ENPLANEMENTS BY AIRLINE

The top destination for passengers departing from the Sunport was the Los Angeles area.

In 2014, the top destination for passengers departing from the Sunport was the Los Angeles area, accounting for 7.1 percent of ABQ originations. Next was Phoenix, which accounted for 6.8 percent of ABQ originations. The top five were rounded out by the San Francisco Bay area (5.8 percent), the Dallas-Ft. Worth area (5.3 percent), and the Washington D.C. area (5.2 percent). A total of 52.5 percent of all passenger enplanements are destined for one of the top 20 markets.

The top 20 destination markets have remained relatively consistent since 2004. There has been some jockeying near the bottom with destinations such as Austin, Tucson, and Kansas City moving into and out of the top 20 over the years.

Passengers that change flights at an airport are still counted as enplaned passengers at that airport but are not considered as originations unless they do so on under a separate ticket itinerary. In those cases, the passenger must check-in again for the new flight. Prior to the Wright Amendment compromise in 2006, this was a method used by travelers from outside the Wright Zone to fly into or out of Love Field in Dallas. In such cases, the travelers had a ticket from their origination with an end destination of ABQ. Upon arriving at ABQ, they checked in with another ticket originating from ABQ to their final destination. The result is a potential inflation of the originations from the Sunport. It also had a slight effect of increasing enplanements as some passengers that would have been on a direct flight had to get off the plane and then check-in to re-board the same plane under a different flight number.

Table 2F presents a history of originations from the Sunport since 1993. From 1993 through 2001, originations averaged 87.2 percent of enplaned passengers. Following the events of 9/11, enplanements declined briefly then began to grow again. However, the percentage of originations declined, averaging 84.3 percent over the next seven years through 2008. The recession of 2008-09 marked the beginning of the ongoing downturn in enplanements.

From 2008 to 2013, originations averaged 86.2 percent of enplanements. So even though the 2006 Wright Amendment compromise, allowing direct flights to states other than those immediately adjacent Texas, would seem to reduce the percentage of originations, it does not appear to have had a significant effect. In 2014, 88.5 percent of enplanements were originations. With the sunset of the Wright Amendment in the fourth quarter of 2014, its full impact will start to be experienced in 2015. Through February, enplanements were down 6.6 percent over the same period in 2014.

As of March 2015, the Sunport has non-stop service to 18 of its top 20 destination markets. Only Boston and Austin, ranked 14th and 18th respectively, do not currently have non-stop service from the Sunport. In addition, if considered individually, Reagan National (DCA) and LaGuardia (LGA) would still be in the top 20 and neither has non-stop service from the Sunport; however, there is service to BWI in Baltimore and JFK in New York.

TABLE 2F
Enplanement vs Origination Comparison
Albuquerque International Sunport

	ABQ All-Carriers T-100 Enplaned	ABQ Originations	Percent ABQ Originations
1993	2,674,582	2,333,080	87.2%
1994	2,930,071	2,597,090	88.6%
1995	2,974,539	2,564,900	86.2%
1996	3,279,318	2,853,770	87.0%
1997	3,074,662	2,706,820	88.0%
1998	2,972,152	2,621,520	88.2%
1999	3,042,824	2,704,445	88.9%
2000	3,034,923	2,663,740	87.8%
2001	2,974,068	2,594,040	87.2%
2002	2,885,649	2,468,120	85.5%
2003	2,948,946	2,447,620	83.0%
2004	3,078,463	2,547,510	82.8%
2005	3,167,743	2,679,150	84.6%
2006	3,173,679	2,747,550	86.6%
2007	3,236,324	2,720,030	84.0%
2008	3,156,189	2,649,420	83.9%
2009	2,880,914	2,511,400	87.2%
2010	2,825,966	2,399,050	84.9%
2011	2,767,082	2,354,140	85.1%
2012	2,629,074	2,269,920	86.3%
2013	2,476,672	2,171,400	87.7%
2014	2,382,511	2,108,010	88.5%

Note: 2014 T-100 Enplaned based upon 12 months ending Sept. 30
Source: USDOT - Bureau of Transportation Statistics, Origin-Destination Survey of Airline Passenger Traffic; T-100 Market Enplaned Passengers

Non-Stop Destinations

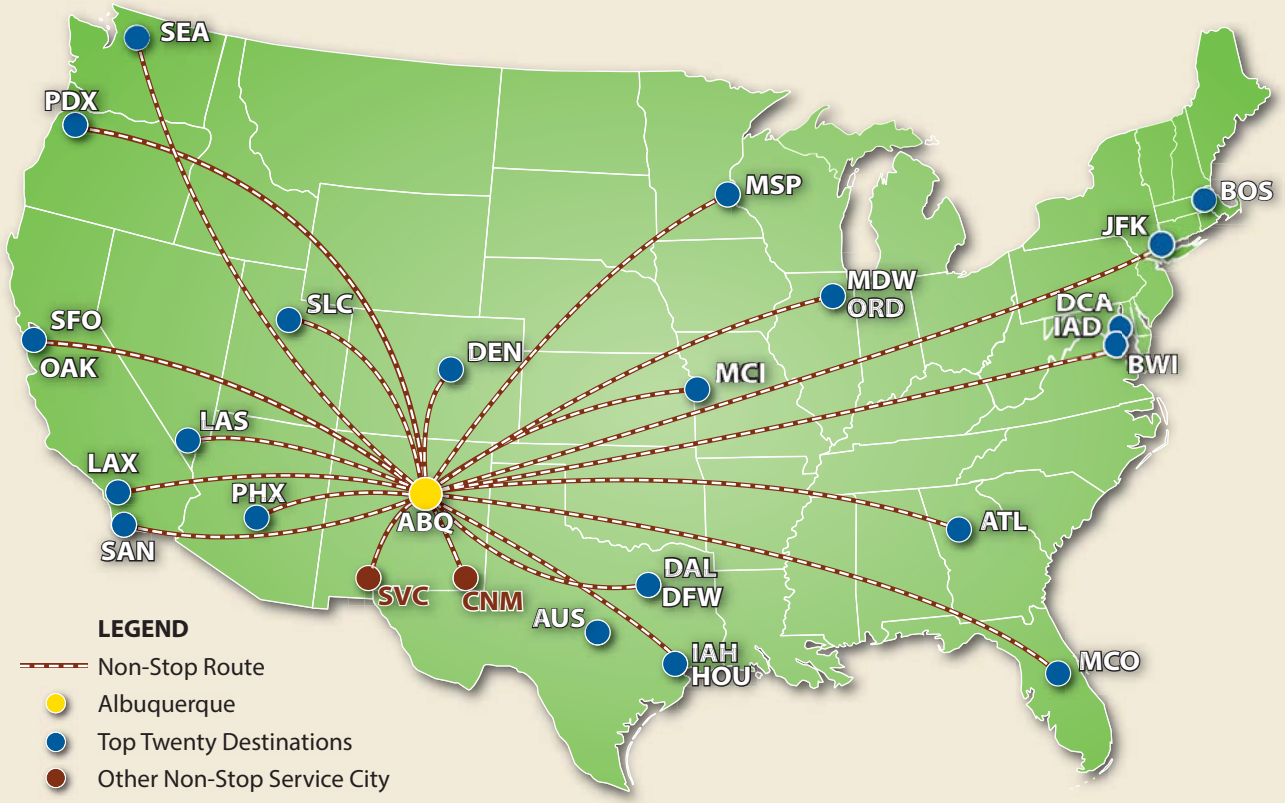
Each of the top 20 is served by at least one daily, non-stop flight except for Austin, TX, and Boston, MA.

Table 2G provides a comparison of the number of daily flights and their non-stop destinations from the Sunport in 1992, 2000, 2009, and 2014. In 2000, there were 149 non-stop destinations, which was an increase over the 130 flights offered in 1992. Since then, the number of non-stop flights has decreased. In 2014, there were 83 daily non-stop flights. The table indicates that the number of non-stop flights within 400 miles of the Sunport has decreased significantly from 82 in 2000 to 25 in 2014. The short flights of less than 200 miles (mostly intrastate) have dropped from 33 in 2000 to only three in 2014. In fact, there have been periods since 2000 when there were no flights of less than 200 miles.

Exhibit 2F lists the top 20 destination markets as of 2014. Each of the top 20 is served by at least one daily, non-stop flight except for Austin, TX, and Boston, MA. Several of the top 20 markets have more

ALBUQUERQUE AREA

TOP TWENTY DESTINATIONS/NON-STOP SERVICE CITY PAIRS



Non-Stop Service Cities (2015)

- New York, NY (JFK)
- Washington D.C. (BWI)
- Atlanta, GA
- Chicago, IL (MDW, ORD)
- Orlando, FL
- Minneapolis/St. Paul, MN
- Kansas City, MO
- Dallas, TX (DAL, DFW)
- Houston, TX (HOU, IAH)
- Denver, CO
- Phoenix, AZ
- Los Angeles, CA (LAX)
- San Diego, CA
- Las Vegas, NV
- San Francisco Area, CA (SFO, OAK)
- Portland, OR
- Seattle, WA
- Silver City, NM
- Carlsbad, NM

Top Twenty Destinations (2014)

1. Los Angeles, CA (LAX)
2. Phoenix, AZ (PHX)
3. San Francisco, CA (OAK, SFO)
4. Dallas Area (DAL, DFW)
5. Washington D.C. (BWI)
6. Las Vegas, NV (LAS)
7. New York, NY (JFK)
8. Denver, CO (DEN)
9. Houston, TX (IAH, HOU)
10. San Diego, CA (SAN)
11. Chicago, IL (MDW, ORD)
12. Seattle, WA (SEA)
13. Portland, OR (PDX)
14. Boston, MA (BOS)
15. Atlanta, GA ATL
16. Orlando, FL (MCO)
17. Salt Lake Cit, UT (SLC)
18. Austin, TX (AUS)
19. Minneapolis/St. Paul, MN (MSP)
20. Kansas City, MO (MCI)

than one commercial service airport. The exhibit also lists the top 20 destinations and the non-stop service available currently.

TABLE 2G
Non-Stop Service 1992, 2000, 2009, 2014
Albuquerque International Sunport

	Daily Flights			
	1992	2000	2009	2014
Less than 200 miles				
Alamogordo	1	1	2	0
Durango	2	2	0	0
Farmington	11	9	0	0
Gallup	0	3	0	0
Las Cruces	2	3	0	0
Los Alamos	5	1	0	3
Roswell	7	6	0	0
Santa Fe	3	0	0	0
Silver City	2	3	2	0
Taos	0	1	0	0
Subtotal	**33**	**29**	**4**	**3**
From 200 to 400 miles				
Amarillo	2	2	1	0
Carlsbad	3	4	2	2
Clovis	2	3	2	0
Colorado Springs	2	3	0	0
Denver	10	10	12	8
El Paso	5	7	2	0
Lubbock	2	2	1	0
Midland/Odessa	1	1	1	0
Phoenix	19	20	15	12
Tucson	2	1	2	0
Subtotal	**48**	**53**	**38**	**22**
From 400 to 600 miles				
Dallas	16	15	16	13
Las Vegas	8	5	6	5
Salt Lake City	3	5	7	3
Subtotal	**27**	**25**	**29**	**21**

	Daily Flights			
	1992	2000	2009	2014
From 600 to 800 miles				
Austin	0	0	0	0
Houston	5	7	9	7
Kansas City	0	3	1	1
Los Angeles Area	6	8	7	6
San Diego	0	3	2	3
Subtotal	**11**	**21**	**19**	**17**
From 800 to 1,000 miles				
Minneapolis	0	2	2	1
St. Louis	3	7	1	0
San Francisco Area	3	2	4	4
Subtotal	**6**	**11**	**7**	**5**
From 1,000 to 1,200 miles				
Chicago	3	2	5	5
Portland	0	0	1	1
Seattle	0	1	1	2
Subtotal	**3**	**3**	**7**	**8**
From 1,200 to 1,400 miles				
Cincinnati	0	2	0	0
Atlanta	0	3	3	3
Subtotal	**0**	**5**	**3**	**3**
Over 1,400 miles				
Baltimore	0	0	1	2
Orlando	0	1	2	1
Pittsburgh	2	0	0	0
Tampa	0	1	1	0
Washington, D.C.	0	0	1	0
New York	0	0	0	1
Subtotal	**2**	**2**	**5**	**4**
Total Non-Stops	**130**	**149**	**112**	**83**

ENPLANEMENT FORECASTS

As discussed in this chapter's introduction, the first step involved in updating an airport's forecasts include reviewing previous forecasts in comparison to actual activity to determine what changes, if any, may be necessary. After that comes the consideration of any new factors that could impact the forecasts, such as changes in the socioeconomic climate or the effects of changes in air carrier services.

Previous Enplanement Forecasts

There are three existing forecasts of enplanement activity at the Sunport to consider:

- Those generated for the previous Master Plan (base year 1999)
- Those generated for the West Area Support Plan (base year 2008)
- FAA Terminal Area Forecast (base year 2014)

The forecasts from the previous Master Plan are nearly 16 years old, while the West Area Support Plan forecasts are seven years old. Since 1999, there have been two national recessions, significant restructuring and consolidation in the airline industry, as well as changes and subsequent repeal of the Wright Amendment.

The FAA TAF forecast is published annually and is utilized by the FAA as a starting point for considering the reasonableness of master plan forecasts. **Table 2H** presents three enplanement forecasts developed previously for the Sunport. The historical enplanements are also included. As can be seen, both the 1999 and the 2008 forecasts have become outdated considering the effects of the 2007-2009 national recession, subsequent slow recovery, and changes in the airline industry, which have led to a decline in enplanements at the Sunport. As a result, only the FAA TAF will be given further consideration.

TABLE 2H
Previous Enplanement Forecasts
Albuquerque International Sunport

Year	Actual Enplanements	1999 Airport Master Plan	2008 West Area Support Plan	2015 FAA TAF
2005	3,244,646	3,902,000		
2010	2,914,129	4,703,000	3,000,000	
2014	2,446,388			2,395,478
2015			3,600,000	2,105,663
2020			4,100,000	2,415,367
2025		7,105,000		2,665,158
2030			5,100,000	2,930,422
2035				3,230,043
AAGR	-3.47%	3.04%	2.69%	1.43%

AAGR: Average annual growth rate

It should be noted, however, the FAA TAF forecasts are based upon the T-100 enplanement data collected by the U.S. Department of Transportation (DOT) and presented in **Table 2F**. This includes revenue passengers only. The enplanement history, presented in Chapter One and in **Tables 2C** and **2D,** is from the Albuquerque Aviation Department records. They are collected from monthly landing and enplanement reports provided by each airline operating at the Sunport. A primary difference is that the airlines also report non-revenue passengers (e.g., flight crews repositioning, free travel earned from frequent

flyer programs) at the Sunport. These travelers do not pay ticket taxes to DOT, so they are not factored into FAA entitlement grants to the Sunport. They do, however, pay a passenger facility charge (PFC) to the Sunport in support of capital improvements and debt service. For comparison to the FAA TAF, the following analysis will be based upon the TAF, then an adjustment will be made to account for the additional passengers included in the Aviation Department records.

Time-Series and Regression Enplanement Forecasts

A variety of time-series extrapolation and regression analyses using multiple variables, including aviation and socioeconomic factors, were tested. It is optimal to have an "r^2" value near or above 0.90, which would represent a very strong correlation and greater statistical reliability. Four time-series trend lines were analyzed and are shown in **Table 2J**. As can be seen, none of them produced an "r^2" value that met the threshold for reliability.

TABLE 2J
Enplanement Projections
Time-Series Analyses

		History	FORECAST			
	r^2	2014	2020	2025	2035	AAGR
TIME-SERIES						
Time Series from 1970	0.78	2,446,388	4,016,352	4,337,574	4,980,017	3.44%
Time Series from 1980	0.54	2,446,388	3,702,823	3,939,313	4,412,294	2.85%
Time Series from 1990	0.00082	2,446,388	2,988,773	2,994,193	3,005,032	0.98%
Time Series from 2000	0.51	2,446,388	2,445,541	2,230,985	1,801,873	-1.45%

Several variables were tested to determine if they might produce more reliable statistical trends. The variables tested were: 1) Six-County Population; 2) Six-County Employment; 3) Gross Regional Product; 4) US Domestic Available Seat Miles; 5) US Commercial Enplanements. The results of the regression analysis did not provide values near the 0.90 threshold. The highest "r^2" value was 0.38 for the Six-County Population. The lack of a correlation is not surprising, as after reasonably predictive growth up through 2000, enplanements have experienced a less predictive pattern over the last 15 years. As a result, the regression trends were not considered further in this analysis.

Travel Propensity Factor

There are a variety of local factors that affect the potential for passengers within an area to travel. A key statistic to consider is the relationship between an airport's enplanements levels to the populace it serves. The ratio of enplanements to population is termed the Travel Propensity Factor (TPF). **Table 2K** presents a historical review of the TPF for the Sunport since 2000.

TABLE 2K
Market Share and Travel Propensity Projections
Albuquerque International Sunport

Year	ABQ T-100 Enplanements	Six-County Population	Travel Propensity Factor	US Domestic Enplanements (Millions)	ABQ Market Share
2000	3,034,923	877,284	3.459	641.2	0.4733%
2001	2,974,068	890,599	3.339	625.3	0.4756%
2002	2,885,649	909,331	3.173	574.6	0.5022%
2003	2,948,946	925,749	3.185	587.3	0.5021%
2004	3,078,463	944,044	3.261	628.5	0.4898%
2005	3,167,743	965,568	3.281	669.5	0.4732%
2006	3,173,679	988,515	3.211	668.4	0.4748%
2007	3,236,324	1,008,132	3.21	688.5	0.4701%
2008	3,156,189	1,023,011	3.085	680.7	0.4637%
2009	2,880,914	1,037,395	2.777	630.8	0.4567%
2010	2,825,966	1,049,197	2.693	634.8	0.4452%
2011	2,767,082	1,060,474	2.609	650.1	0.4256%
2012	2,629,074	1,065,066	2.468	653.8	0.4021%
2013	2,476,672	1,068,018	2.319	654.4	0.3785%
2014	2,341,855	1,095,598	2.138	668.4	0.3504%
Constant Market Share of U.S. Domestic Enplanements (AAGR = 1.69%)					
2020	2,600,000	1,244,558	2.089	742.0	0.3504%
2025	2,791,000	1,336,188	2.089	796.6	0.3504%
2035	3,332,000	1,498,294	2.224	951.0	0.3504%
Constant Travel Propensity Factor (AAGR = 1.50%)					
2020	2,660,000	1,244,558	2.138	742.0	0.3585%
2025	2,856,000	1,336,188	2.138	796.6	0.3585%
2035	3,203,000	1,498,294	2.138	951.0	0.3368%
FAA TAF 2015 (AAGR = 1.54%)					
2020	2,415,367	1,244,558	1.941	742.0	0.3255%
2025	2,665,158	1,336,188	1.995	796.6	0.3346%
2035	3,230,043	1,498,294	2.156	951.0	0.3396%

AAGR: Average Annual Growth Rate (2014-2035)

The ratio of enplanements to population is termed the Travel Propensity Factor (TPF).

The TPF is predominantly impacted by the proximity of an airport to other regional airports with higher levels of service or "hub" airports. Regional airports with higher TPF ratios tend to be located farther from hub airports in relatively isolated areas. These airports generally have a service area that extends into adjacent, well-populated regions or have some type of air service advantage that attracts more of those passengers that might otherwise choose to drive to a more distant hub airport. Generally, the higher the TPF, the more likely air travelers are to utilize the local airport for commercial service.

As can be seen in the table, the TPF has generally trended with the condition of the national economy. Even in the 1990s when the economy was growing, the Sunport generally experienced growth in enplanements per resident within its primary service area. Following the 2001 recession and the events of 9/11, the TPF declined from 3.46 in 2000 to 3.17 in 2002. The ratio reached to 3.28 for 2005 but has

generally declined every year through 2014. Just prior to the recession of 2007-2009, the TPF was at 3.21. Since the recession, the TPF has steadily declined to 2.138 in 2014. **Table 2K** presents an enplanement projection based upon maintaining the current TPF over the forecast period. This would result in 3.20 million passengers by 2035.

Market Share of U.S. Domestic Enplanements

The next forecasting method employed considers the Sunport's market share of U.S. domestic enplanements. National forecasts of U.S. domestic enplanements are compiled each year by the FAA and consider the state of the economy, fuel prices, and prior year developments. The most recent publication is FAA *Aerospace Forecasts – Fiscal Years 2015-2035*. Three enplanement forecasts based on the Sunport's historical market share of total air carrier enplanements have been developed and are also presented in **Table 2K**. Since 2002, the Sunport's market share has generally been declining.

The table presents an enplanement projection based upon the Sunport maintaining the 2014 market share into the future. This would result in a slow increase in the TPF over the planning period, and result in 3.33 million passengers by 2035. By contrast, the constant TPF projection results in a slow but continued decline in the market share over the forecast period.

TAF High/Low Range

The FAA will review the forecasts for the Master Plan and will approve them provided they are consistent with the TAF by being within 10 percent in years 1-5 and within 15 percent thereafter. To better define the range of reasonableness, both a high and low range based on the TAF forecast are considered. The low range forecast results in an annual growth rate of 1.16 percent and a long-term enplanement total of 2.75 million. The high range TAF forecast results in an annual growth rate of 1.65 percent and a long-term enplanement level of 3.71 million enplanements.

Selected Enplanement Forecast

Table 2K and **Exhibit 2G** include the FAA TAF for comparison to the two projections. The TAF is below both projections through 2025, but by 2035 is slightly higher than the TPF projection. As a result, the TPF and market share would decline through the short-term but begin to recover over the remainder of the forecast period. Given the continued decline during the slow recovery of the recession and the potential for further impacts in the near term from the sunset of the Wright Amendment and airline capacity reduction, the FAA Terminal Area Forecasts appear to be a reasonable estimate for use in the master plan.

As mentioned earlier, the TAF is based upon Form T-100 data as reported to the FAA by the airlines and is based primarily upon revenue passengers. The airlines also report passenger totals to the

Exhibit 2G
ENPLANEMENT FORECASTS

This page intentionally left blank

Albuquerque Aviation Department that include non-revenue passengers. Both reports have importance in the master plan process, but the total passengers reported to the Aviation Department will affect facility requirement planning more. As a result, an adjustment is made to the TAF forecast to account for non-revenue passengers.

The T-100 enplanements as a percentage of the Aviation Department enplanements have fluctuated slightly around 97 percent over the past 20 years. In line with this average, the TAF projections are adjusted 3.1 percent to account for the additional passengers reported to the Aviation Department. This forecast is presented in **Table 2L** as well as on **Exhibit 2G**.

TABLE 2L
Passenger Enplanement Forecast
Albuquerque International Sunport

	2014	2020	2025	2035
FAA Terminal Area Forecast – 2015	2,341,855	2,415,367	2,665,158	3,230,043
ABQ Total Enplanement Forecast	2,446,388	2,490,000	2,750,000	3,330,000

AIRLINE OPERATIONS FORECAST

The commercial service fleet aircraft mix defines a number of key parameters in airport planning, including critical aircraft (for pavement design and ramp geometry), terminal complex layout, and maximum stage length capabilities (affecting runway length evaluations). A projection of the fleet mix for the Sunport has been developed by reviewing equipment used by the carriers serving the Sunport. **Exhibit 2H** depicts the aircraft fleet mix and seating capacities of the airlines serving the Sunport. All regional airlines with an affiliation to another carrier are grouped under the parent company.

Changes in equipment, airframes, and engines have always had a significant impact on airlines and airport planning. There are many ongoing programs by the manufacturers to improve performance characteristics. These programs continue to focus on improvements in fuel efficiency. Regional jets also became a larger factor as the airlines looked for ways to reduce costs. Many airlines replaced larger commercial jets, as well as commuter turboprops on smaller emerging routes with regional jets.

Commuter airlines are transitioning to advanced turboprop aircraft and regional jets to fit their market needs. Many of these aircraft have greater seating capacity, lower operating costs, and are considerably more comfortable for the flying public. The regional jets made their initial impact in the 44- to 50-seat range. Regional jet aircraft eventually became available with as few as 37 seats and as many as 100 seats. This bridged a long-existing gap in seating capacity, making regional jets the aircraft of choice at non-hub and small-hub airports.

As the price of fuel rose, however, the 50-seat and smaller regional jets have been found to be less cost-effective than their counterparts with over 60 seats. In fact, the higher seat capacity turboprops, such as the Q400, have been more cost-effective than the 50-seat jet carrying the same number of passengers. As a result, the 50-seat regional jets are no longer in production and can eventually be expected to be eliminated from the fleet. This will occur over time, however, as some regional carriers will

Aircraft Type		Alaska Airlines	American Airlines	Delta	jetBlue Airways	Southwest	United Airlines	Average
	B767-400						242	242
	B767-300		218				181	200
	A-321		184		190			187
	B757-200		184	180			182	182
	B737-900	181		180			167	174
	MD-90			160				160
	B737-800	163	150	160		175	152	200
	MD-88			149				149
	A-320			150	150		138	146
	B737-300	144				143		143
	B737-700	124		124		143	118	143
	MD-80		140					140
	A-319		128	126			128	127
	B737-500					122		122
	B717-200			120			117	117
	ERJ-190				100			100
	CRJ-900			76				76
	ERJ-175		76	76				76
	ERJ-170			69			72	71
	Q400						71	71
	CRJ-700		65	65			66	65
	ATR-72		64					64
	CRJ-100/200		50	50			50	50
	ERJ-145		50	50			50	50
	Q300						50	50
	ERJ-140		44					44
	ERJ-135						37	37
	Q200						37	37
	SF-340						34	34
	EMB-120			28			30	29
	Beech 1900						19	19

Note: Regional airline aircraft are included in the affiliate airline fleet.

maintain them for some services, as well as in code sharing with major airlines that have restrictive scope clauses with pilots' unions that restrict code sharing on aircraft above a certain seating capacity.

In addition, turboprops that have been the workhorses for the small commuter markets are also no longer in production. In fact, the only commuter turboprops still in production are the ATR 42 in the 40- to 60-seat range as well as the Q-400 and ATR-72 each with more than 60 seats. Unless there is a new aircraft manufactured in the range of 10 to 39 seats, smaller markets that cannot support the larger turboprops could lose service from anything over nine-seat aircraft.

Table 2M presents the historical airline operational fleet mix by seat capacity since 1999 and the forecast fleet mix. In 1999, 21.9 percent of the airport's scheduled flights were by aircraft with 39 seats or fewer. By 2008, this figure had declined to only 2.8 percent, while the 40-59 seat category had increased from 0.8 percent to over 18.3. This change in the operational fleet mix captures the rise of the 50-seat regional jet. By 2014, as the 50-seat regional jet was being phased out, the 40-59 seat category declined to 11.6 percent of operations.

TABLE 2M
Airline Fleet Mix and Operations Forecast
Albuquerque International Sunport

Fleet Mix	Historical			Forecast		
Seating Capacity	1999	2008	2014	2020	2025	2035
>220	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%
165-219	2.3%	1.2%	1.7%	1.0%	1.0%	2.0%
145-164	7.7%	3.1%	5.5%	11.0%	12.0%	12.0%
125-144	52.7%	63.5%	51.4%	48.0%	46.0%	42.0%
105-124	14.6%	7.1%	5.1%	5.0%	6.0%	7.0%
91-104	0.0%	0.0%	0.0%	1.0%	2.0%	3.0%
75-90	0.0%	0.0%	11.5%	14.0%	15.0%	17.0%
60-74	0.0%	3.5%	8.1%	11.0%	12.0%	13.0%
40-59	0.8%	18.3%	11.6%	5.0%	2.0%	0.0%
20-39	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%
<19	21.9%	2.8%	5.0%	4.0%	4.0%	3.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Avg. Seats per Departure	106.3	110.9	107.5	107.5	108.5	113.9
Boarding Load Factor	58.7%	69.8%	79.6%	82.0%	83.0%	84.0%
Enplaned per Departure	62.4	77.4	85.6	88.1	90.1	99
Annual Enplanements	3,113,951	3,256,793	2,446,388	2,490,000	2,750,000	3,330,000
Annual Departures	49,931	42,098	28,586	28,300	30,500	35,000
Annual Operations	99,862	84,196	57,172	56,600	61,000	70,000

The table also shows the increase in seating capacity in the 75-90 seat category, which by 2014 accounted for 11.5 percent of operations where there were none in 2008. This reflects the phasing out of smaller 50-seat regional jets (e.g., ERJ 140/145, CRJ-200) and the introduction of larger regional jets (e.g., ERJ 175/190, CRJ 700/900).

The average seats per departure increased from 106.3 in 1999 to 110.9 in 2008. In 2014, the average number of seats per departure declined to 107.5. Over time, the average number of seats per departure can be expected to increase as more capacity (i.e., larger aircraft) continues to be introduced into the system. However, the total number of seats available may continue to decline as the frequency of flights decline in order for airlines to continue to generate a profit.

The boarding load factor (BLF) is defined as the ratio of passengers boarding aircraft compared to the seating capacity of the aircraft. The BLF at the Sunport has increased dramatically since 1999, growing from 58.7 percent to 79.6 percent in 2014. This has occurred at airports across the country as airlines have worked to improve efficiency and reduce costs. In the future, boarding load factors can be expected to continue to grow somewhat.

With an increase in both seating capacity and boarding load factors, the number of passengers on each aircraft flight has also grown significantly over the past 15 years. The average enplanements per departure were 62.4 in 1999. By 2008, the ratio had grown to 77.4, and by 2014, the ratio had jumped to 85.6 enplanements per departure. So along with the 21 percent reduction in enplanements over that period, there has been a 43 percent reduction in the number of commercial service flights.

Most commercial operations are forecast to continue to be represented by aircraft in the 125- to 164-seat category.

Most commercial operations are forecast to continue to be represented by aircraft in the 125- to 164-seat category. This includes the Boeing 737 series and the A320/21 aircraft. The 50-passenger regional jet aircraft will diminish as regional jets with higher seating capacities increase. Service by smaller commuter turboprops, however, is expected to continue to decline.

AIR CARGO

Air freight includes the combined activities of the scheduled passenger airlines carrying freight on scheduled flights and the dedicated all-cargo carriers. Air mail may also be carried by both the scheduled passenger airlines and all-cargo carriers. Freight and mail together make up air cargo activity at an airport. This section describes the national aviation trends in the air cargo airline industry, historical activity at the Sunport, and future projections of air cargo activity.

NATIONAL AIR CARGO TRENDS

Air cargo activity has historically had a high correlation to gross domestic product (GDP). Other factors that affect air cargo growth are real yields, improved productivity, and globalization. Ongoing trends that are and will continue to improve the air cargo market include the opportunities from open skies agreements, decreasing costs from global airline alliances, and increasing business volumes from e-commerce. At the same time, trends that could limit air cargo growth include increased use of mail substitutes (e-mail) and increased airline costs due to environmental and security restrictions.

Before 2001, air cargo was the fastest growing sector of the aviation industry. From 1994 through 2000, total tons and revenue ton-miles (RTMs) grew at annual average rates of 8.0 and 8.6 percent, respectively. An economic slowdown in the U.S., combined with the collapse in the high-tech industry and a slowing of imports, resulted in declines of 5.0 percent in tons and 3.9 percent in RTMs in 2002. Domestic RTMs grew modestly through 2007 and then realized a steep decline that coincided with the 2008-2009 national recession. In 2007, RTMs had reached 15.2 billion tons; by 2011, only 12.0 billion RTMs were realized. Domestic RTMs have been growing since 2012 and are forecast to grow 0.6 percent annually through the forecast period. By 2035, RTMs are forecast to reach 14.4 billion.

The FAA notes there are several structural changes that are occurring within the air cargo industry. Among them are the following:

Security regulations – On August 3, 2007, *Recommendations of the 9/11 Commission Act of 2007* was signed into law. Section 1602 of this Act states that air cargo placed on passenger aircraft will receive the same level of screening as passenger-checked baggage. Legislation called for the establishment of a system by 2010 that required 100 percent inspection of cargo transported by passenger aircraft.

Market maturation – The express market in the United States has matured after dramatic growth over the last two decades. This represents the majority of domestic air cargo activity.

Modal shift – Improved service and economics from the use of alternative modes of cargo transported by the integrated cargo carriers (e.g., FedEx and UPS) has matured.

Increases in air fuel surcharges – Fuel costs are a significant factor for all aviation.

Increased USPS use of all-cargo carriers – This initially resulted from the U.S. Postal Service's (USPS) need to improve control over delivery. The trend has continued due to security regulations.

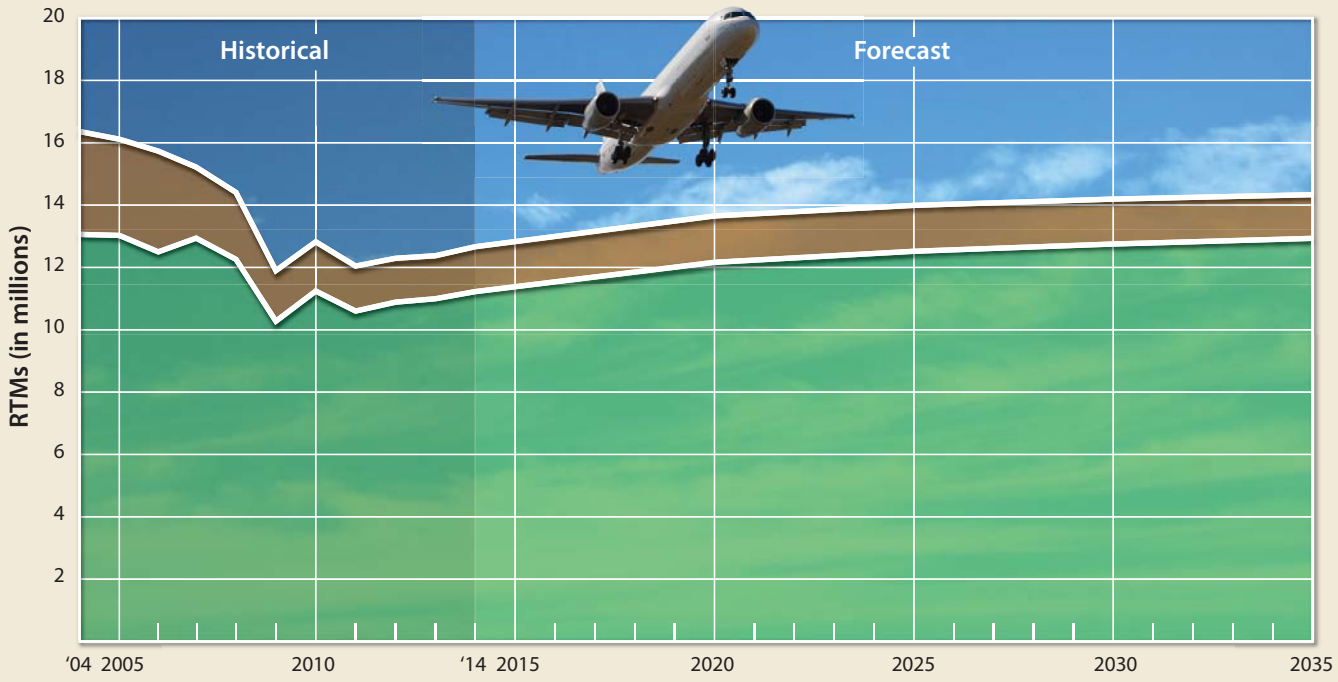
Increased use of mail substitutes – Substitutes such as e-mail affect mail volume. The residual fear of mail because of terrorism has also been a factor.

The FAA forecast for RTMs was based on several specific assumptions exclusive to the air cargo industry. First, security restrictions will remain in place. Second, most of the shift from air to ground transportation has occurred. Finally, long-term cargo activity is tied to economic growth.

The largest growth will continue to be in international cargo, which is projected to grow at an annual average rate of 4.7 percent from 2014 through 2035. Total domestic air cargo is forecast to grow at an annual rate of 0.6 percent over the same period. Within the total domestic RTM, all-cargo carriers are projected to grow 0.7 percent annually while domestic passenger RTMs are forecast to experience -0.1 percent growth. The top half of **Exhibit 2J** depicts the FAA forecasts for total RTMs.

The number of large cargo jet aircraft increased by 17 aircraft in 2014, primarily due to the addition of 757Fs to the FedEx fleet. For the remainder of the forecast period, cargo large jet aircraft at U.S. carriers are forecast to grow at an average annual rate of 1.8 percent to 1,082 aircraft in 2035. The narrow-body,

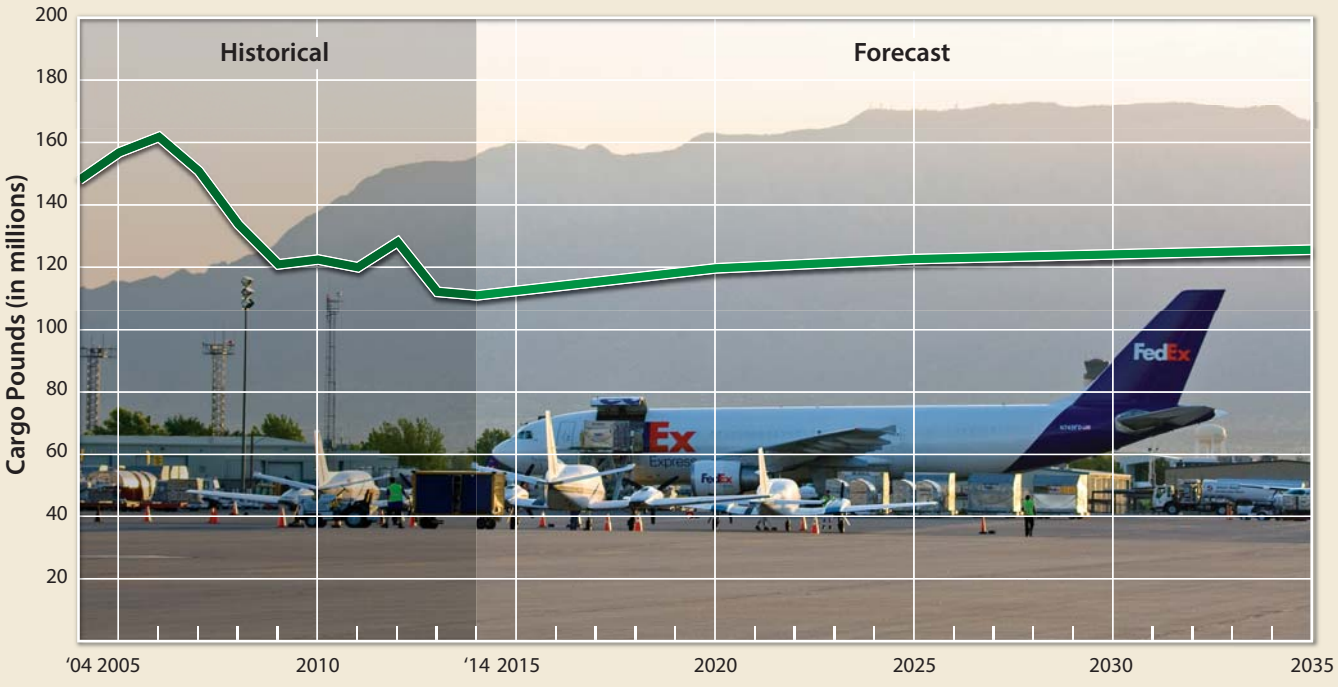
DOMESTIC AIR CARGO REVENUE TON MILES (RTMs)
U.S. COMMERCIAL CARRIER



REVENUE TON MILES[1]	2014	2020	2025	2035	AAGR 2014-2035
All-Cargo Carriers	11,225.6	12,165.2	12,519.7	12,934.1	0.68%
Passenger Carriers	1,440.7	1,488.1	1,472.6	1,401.2	-0.13%
TOTAL	**12,666.2**	**13,653.3**	**13,992.3**	**14,335.3**	**0.59%**

[1]In millions of tons
Source: FAA Aerospace Forecasts 2015-2035

ALBUQUERQUE INTERNATIONAL SUNPORT AIR CARGO TOTAL POUNDS



cargo jet fleet is projected to increase by three aircraft per year over the forecast period as older 757s and 737s are converted to cargo service. The wide-body, cargo jet fleet is projected to increase by 13 aircraft yearly.

AIR CARGO FORECAST

Air cargo is comprised of air freight, air express, and air mail. Air freight and express is handled by both passenger airlines and all-cargo airlines. Air mail is now primarily handled by an all-cargo carrier under contract with the United States Postal Service.

Until the mid-1980s, air cargo to and from the Albuquerque area was carried almost exclusively by the passenger airlines as belly freight. That began to change with the introduction of the overnight package delivery carriers. In the mid-to-late 1980s, all-cargo carriers, such as Airborne (now DHL Worldwide), FedEx, and UPS, began to serve ABQ with priority overnight service. That service later expanded to include next-day, second-day, and third-day service. Today, nearly all air cargo is handled by the dedicated air cargo operators.

Table 2N presents the forecast of total air cargo weight for the Sunport. The forecast was developed by comparing the total air cargo handled at the Sunport (both enplaned and deplaned) with the FAA's national forecast of air cargo revenue ton miles. Utilizing a constant market share of the national forecast, a long-term forecast emerges. The average annual growth rate of the forecast is 0.59 percent.

The bottom half of **Exhibit 2J** shows the forecast for the Sunport. The forecast indicates that the Sunport may expect a modest increase in total air cargo. The existing facilities are adequate to accommodate current and future air cargo activity.

TABLE 2N
Air Cargo Forecast
Albuquerque International Sunport

Year	ABQ Air Cargo Total (lbs.)[1]	ABQ Air Cargo Total Tons	U.S. Revenue Ton-Miles[2]	Airport Market Share
2004	158,294,120	79,147	15,150,100,000	1.044839%
2005	166,342,642	83,171	15,265,000,000	1.089700%
2006	167,979,472	83,990	15,380,900,000	1.092130%
2007	153,463,817	76,732	15,219,100,000	1.008363%
2008	136,244,528	68,122	14,407,600,000	0.945643%
2009	123,036,357	61,518	11,898,600,000	1.034041%
2010	124,061,134	62,031	12,823,100,000	0.967482%
2011	121,413,883	60,707	12,046,900,000	1.007843%
2012	128,742,484	64,371	12,294,800,000	1.047130%
2013	112,636,638	56,318	12,376,800,000	0.910063%
2014	111,404,466	55,702	12,666,200,000	0.879541%
Constant Market Share/Selected Forecast (AAGR = 0.59%)				
2020	120,086,000	60,043	13,653,300,000	0.879541%
2025	123,068,000	61,534	13,992,300,000	0.879541%
2035	126,085,000	63,043	14,335,300,000	0.879541%

Source: [1]Airport records include freight, express, and mail. [2]FAA Aerospace Forecasts Fiscal Years 2015-2035.

ALL-CARGO OPERATIONS

As presented in Chapter One – Inventory, the Sunport has five all-cargo carriers currently. FedEx and UPS are the mainline all cargo carriers. AmeriFlight and Empire Air are both feeder airlines for FedEx, and South Aero is a feeder airline for UPS.

Table 2P examines the cargo aircraft mix at the Sunport now and in the future. In 2014, there were 6,826 operations by the feeder airlines. FedEx and UPS accounted for an additional 3,376 operations for a total of 10,202 operations by cargo carriers. The air cargo carrier operations forecast is based on an annual growth rate of 0.59 percent (same as the FAA national forecast).

TABLE 2P
Air-Cargo Airline Landings
Albuquerque International Sunport

FAA Gross Landing Weight (lbs.)	Actual	Forecast		
	2014	2020	2025	2035
>320,000 (B767, DC10)	832	862	888	947
280,000-320,000 (A300)	759	786	810	864
210,000-280,000 (A310)	9	9	10	10
161,000-210,000 (B757)	77	80	82	88
30,000-161,000 (B727)	11	11	12	12
<30,000 (Commuter)	3,413	3,536	3,641	3,885
Annual Landings	**5,101**	**5,250**	**5,450**	**5,800**
Annual Operations	**10,202**	**10,500**	**10,900**	**11,600**

Note: Assumes constant growth rate of 0.59 percent annually

GENERAL AVIATION FORECASTS

General aviation encompasses all portions of civil aviation, except commercial service and military operations. To determine the types and sizes of facilities that should be planned to accommodate general aviation activity at the Sunport, certain elements of this activity must be forecast. These indicators of general aviation demand include based aircraft, aircraft fleet mix, and annual operations.

NATIONAL GENERAL AVIATION TRENDS

The FAA forecasts the fleet mix and hours flown for single engine piston aircraft, multi-engine piston aircraft, turboprops, business jets, piston and turbine helicopters, light sport, experimental, and others (gliders and balloons). The FAA forecasts "active aircraft," not total aircraft. An active aircraft is one that is flown at least one hour during the year. From 2010 through 2013, the FAA undertook an effort to have all aircraft owners re-register their aircraft. This effort resulted in a 10.5 percent decrease in the number of active general aviation aircraft, mostly in the piston category.

After growing rapidly for most of the decade, the demand for business jet aircraft slowed over the past few years, as the industry was hit hard by the 2008-2009 economic recession. Nonetheless, the FAA forecast calls for growth through the long-term, driven by higher corporate profits and continued concerns about safety, security, and flight delays. Overall, business aviation is projected to outpace personal/recreational use.

In 2014, the FAA estimated there were 139,890 piston-powered aircraft in the national fleet. The total number of piston-powered aircraft in the fleet is forecast to decline by 0.5 percent from 2014-2035, resulting in 125,935 by 2035. This includes -0.6 percent annually for single engine pistons and -0.4 percent for multi-engine pistons.

Total turbine aircraft are forecast to return to growth in 2014 and have an annual growth rate of 2.4 percent through 2035. The FAA estimates there were 28,085 turbine-powered aircraft in the national fleet in 2014, and there will be 45,905 by 2035. This includes annual growth rates of 1.5 percent for turboprops, 2.8 percent for business jets, and 2.8 percent for turbine helicopters.

While comprising a much smaller portion of the general aviation fleet, experimental aircraft, typically identified as home-built aircraft, are projected to grow annually by 1.4 percent through 2035. The FAA estimates there were 24,480 experimental aircraft in 2014, and these are projected to grow to 33,040 by 2035. Sport aircraft are forecast to grow 4.3 percent annually through the long-term, growing from 2,200 in 2014 to 5,360 by 2035. **Exhibit 2K** presents the historical and forecast U.S. active general aviation aircraft.

The FAA also forecasts total operations based upon activity at control towers across the U.S. Operations are categorized as air carrier, air taxi/commuter, general aviation, and military.

General aviation operations, both local and itinerant, declined significantly as a result of the 2008-2009 recession and subsequent slow recovery. Through 2035, total general aviation operations are forecast to grow 0.4 percent annually. Air taxi/commuter operations are forecast to decline by 3.6 percent through 2024, and then increase slightly through the remainder of the forecast period. Overall, air taxi/commuter operations are forecast to decline by 1.2 percent annually from 2014 through 2035.

Through 2035, total general aviation operations are forecast to grow 0.4 percent annually.

General Aviation Aircraft Shipments and Revenue

As previously discussed, the 2008-2009 economic recession has had a negative impact on general aviation aircraft production, and the industry has been slow to recover. Aircraft manufacturing declined for three straight years from 2008 through 2010. According to the General Aviation Manufacturers Association (GAMA), there is optimism that aircraft manufacturing will stabilize and return to growth, which has been evidenced since 2011. **Table 2Q** presents historical data related to general aviation aircraft shipments.

TABLE 2Q
Annual General Aviation Airplane Shipments
Manufactured Worldwide and Factory Net Billings

Year	Total	SEP	MEP	TP	J	Net Billings ($millions)
1994	1,132	544	77	233	278	3,749
1995	1,251	605	61	285	300	4,294
1996	1,437	731	70	320	316	4,936
1997	1,840	1043	80	279	438	7,170
1998	2,457	1508	98	336	515	8,604
1999	2,808	1689	112	340	667	11,560
2000	3,147	1,877	103	415	752	13,496
2001	2,998	1,645	147	422	784	13,868
2002	2,677	1,591	130	280	676	11,778
2003	2,686	1,825	71	272	518	9,998
2004	2,963	1,999	52	321	591	11,918
2005	3,590	2,326	139	375	750	15,156
2006	4,053	2,513	242	412	886	18,815
2007	4,276	2,417	258	465	1,136	21,837
2008	3,970	1,943	176	538	1,313	24,772
2009	2,279	893	70	446	870	19,474
2010	2,020	781	108	368	763	19,715
2011	2,120	761	137	526	696	19,097
2012	2,133	790	91	580	672	18,873
2013	2,345	900	122	645	678	23,450
2014	2,445	986	143	603	722	24,499

SEP - Single Engine Piston; MEP - Multi-Engine Piston; TP - Turboprop; J - Turbofan/Turbojet
Source: General Aviation Manufacturers Association 2013 Statbook; 2014 data from Year End Report.

Worldwide shipments of general aviation airplanes increased for the fourth year in a row in 2014. A total of 2,445 units were delivered around the globe, as compared to 2,345 units in 2013. Worldwide general aviation billings were also higher than the previous year.

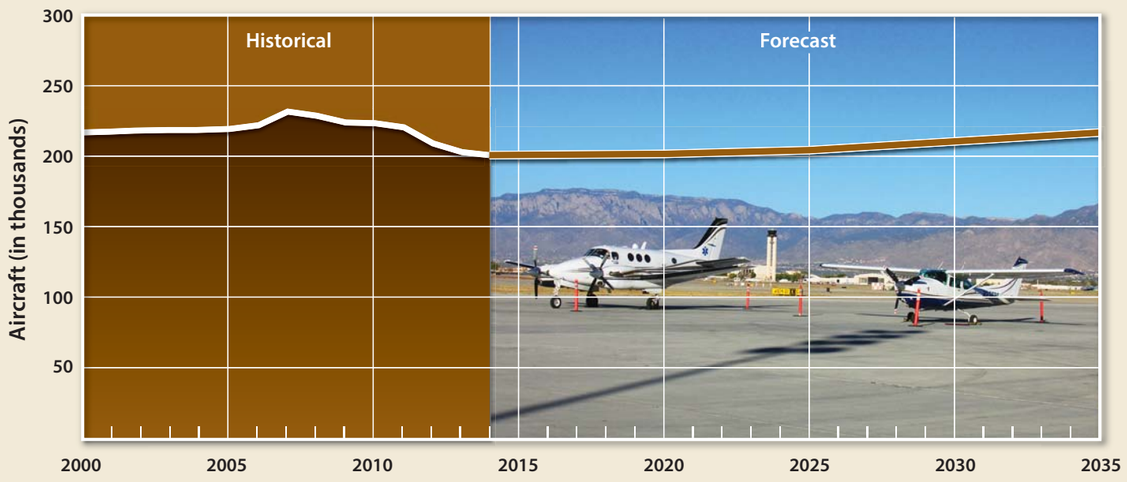
Business Jets: General aviation manufacturers delivered 722 business jets in 2014, as compared to 678 units in 2013. Similar to 2013, demand was stronger in 2014 for large-cabin business jets than it was for medium and light business jets.

Turboprops: In 2014, 603 turboprop airplanes were delivered to customers around the world, a slight decline from the 645 delivered in 2013. Overall, the turboprop market has experienced significant gains since 2010.

Pistons: Piston deliveries increased from 1,022 units during 2013 to 1,129 in 2014. The piston segment continued to fare best for unit deliveries among the three segments by which GAMA tracks the airplane manufacturing industry. This is due in part by deliveries to flight schools in emerging markets.

U.S. ACTIVE GENERAL AVIATION AIRCRAFT

	2014	2020	2025	2035	AAGR 2014-2035
Fixed Wing					
Piston					
Single Engine	123,440	117,770	113,905	108,810	-0.60%
Multi-Engine	13,215	12,920	12,545	12,135	-0.41%
Turbine					
Turboprop	9,485	9,315	9,855	12,970	1.50%
Turbojet	11,750	13,115	15,000	20,815	2.76%
Rotorcraft					
Piston	3,235	3,785	4,165	4,990	2.09%
Turbine	6,850	8,410	9,595	12,120	2.75%
Experimental					
	24,480	26,795	28,875	33,040	1.44%
Sport Aircraft					
	2,200	3,170	3,970	5,360	4.33%
Other					
	4,205	4,130	4,060	4,020	-0.21%
Total Pistons	139,890	134,475	130,615	125,935	-0.50%
Total Turbines	28,085	30,840	34,450	45,905	2.37%
Total Fleet	198,860	199,410	201,970	214,260	0.36%

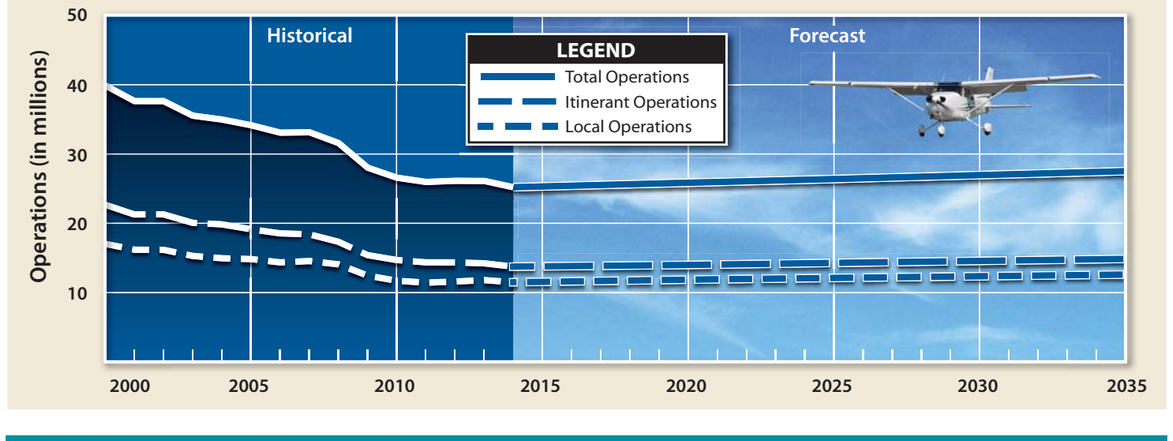


Notes: An active aircraft is one that has a current registration and was flown at least one hour during the calendar year.

Source: FAA Aerospace Foreast - Fiscal Years 2015-2035

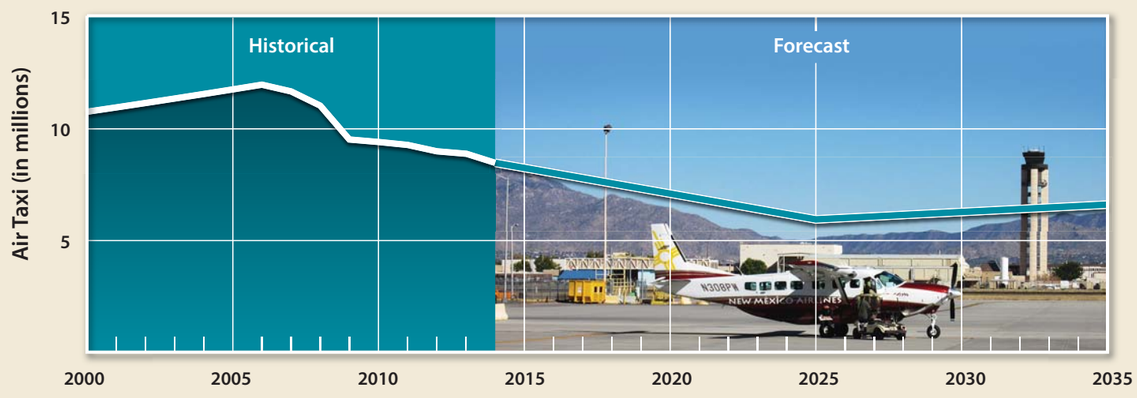
U.S. GENERAL AVIATION OPERATIONS

	2014	2020	2025	2035	AAGR 2014-2035
Itinerant					
	13,977,500	14,209,500	14,499,400	15,118,400	0.37%
Local					
	11,674,100	12,048,000	12,298,900	12,834,800	0.45%
Total GA Operations	**25,651,600**	**26,257,500**	**26,798,200**	**27,953,200**	**0.41%**



U.S. GENERAL AVIATION AIR TAXI

	2014	2020	2025	2035	AAGR 2014-2035
Air Taxi/Commuter Operations					
Itinerant	8,439,300	7,075,700	5,918,500	6,580,200	-1.18%



This page intentionally left blank

Most industry observers believe that the general aviation market, particularly the business aviation market, is in a position for sustained growth. Industry net orders are back to positive and most leading indicators continue to improve. The large jet category of the market is expected to expand faster than the other categories.

BASED AIRCRAFT FORECAST

The number of based aircraft is the most basic indicator of general aviation demand. By first developing a forecast of based aircraft for the Sunport, other general aviation activities and demand can be projected. The process of developing forecasts of based aircraft begins with an analysis of aircraft ownership in the primary general aviation service area through a review of historical aircraft registrations.

The number of based aircraft is the most basic indicator of general aviation demand.

The forecasts to follow consider civilian based aircraft and not military based aircraft. For security reasons, the specific number of military aircraft based at Kirtland AFB is not publicly available; however, the FAA Form 5010 estimates there to be 54. This approximation is necessary when considering projects that could impact military activity.

Area Aircraft Ownership (Registered Aircraft)

Analysis presented earlier indicates that Bernalillo County is the primary service area for general aviation demand. Aircraft ownership trends for the primary service area typically dictate the based aircraft trends for an airport. As such, an analysis of Bernalillo County aircraft registrations was made.

Bernalillo County is the primary service area for general aviation demand.

Table 2R presents the history of registered aircraft in Bernalillo County from 1993 through 2014 (excluding balloons, gliders, ultralights, etc.). These figures are derived from the FAA aircraft registration database that categorized registered aircraft by county based on the zip code of the registered aircraft. Although this information generally provides a correlation to based aircraft, it is not uncommon for some aircraft to be registered in the county but based at an airport outside the county or vice versa.

In 2014, there were 605 aircraft registered in the county, which is the eighth consecutive year of decline. This represented the lowest level since before 1993 and is an indicator of how the national recession of 2008-2009 negatively impacted general aviation as a whole. The highest number of registered aircraft was 837 in 2007. Now that the actual number of registered aircraft has been identified, several projections of future registered aircraft are considered for the 20-year planning horizon.

In 2014, there were 605 aircraft registered in the county.

TABLE 2R
Bernalillo County Registered Aircraft

Year	SEP	MEP	TP	J	H	Total
1993	532	81	20	22	11	**666**
1994	536	93	21	21	11	**682**
1995	547	94	22	29	11	**703**
1996	574	92	25	29	9	**729**
1997	554	82	25	32	11	**704**
1998	559	80	26	29	12	**706**
1999	587	81	30	36	13	**747**
2000	608	91	31	34	16	**780**
2001	595	91	42	53	15	**796**
2002	589	93	44	51	15	**792**
2003	544	70	55	102	14	**785**
2004	533	69	58	111	13	**784**
2005	536	70	60	110	12	**788**
2006	604	134	35	20	21	**814**
2007	589	154	53	21	20	**837**
2008	576	104	106	35	13	**834**
2009	571	93	72	37	14	**787**
2010	567	91	62	27	33	**780**
2011	557	87	55	27	36	**762**
2012	496	77	46	34	54	**707**
2013	457	69	49	25	45	**645**
2014	429	64	39	27	46	**605**

SEP-Single engine piston; MEP-Multi-engine Piston, TP-Turboprop, J-Jet, H-Helicopter
Source: FAA Aircraft Registration Database

Registered aircraft projections are presented in **Table 2S**. These projections evaluate the potential growth of aircraft demand (registered aircraft) in Bernalillo County over the next 20 years.

Since 2007, the number of registered aircraft in Bernalillo County has declined annually. In 2014, there were 605 registered aircraft compared to 837 in 2007. As a result, various regression and time-series analyses did not result in a reliable forecast. Therefore, several market share forecasts have been developed.

The first two projections consider the county's market share of total active general aviation aircraft in the U.S. fleet as identified in the FAA's annual forecasts. The first projection considers the county maintaining its 2014 percent (0.3042%) as a constant into the forecast years. This results in a long-term projection of 652 registered aircraft and an annual growth rate of 0.36 percent. The second projection considers the potential for a return to growth by reclaiming the 15-year average market share of registered aircraft as a ratio to the U.S. active aircraft fleet (0.3537 percent). This results in an annual growth rate of 1.08 percent. By 2035, this projection results in 758 registered aircraft in the county.

The next two projections consider the ratio of forecast population for the county to registered aircraft. The first of these projections considers the county maintaining its 2014 ratio of 0.8758 aircraft per 1,000 people in the county. This results in a 2035 projection of 816 registered aircraft and an annual growth

rate of 1.44 percent. The second projection considers reclaiming the 15-year average (1.2269) of registered aircraft per 1,000 county residents which is an annual growth rate of 3.08 percent.

TABLE 2S
Registered Aircraft Projections
Bernalillo County

Year	County Registrations[1]	U.S. Active Aircraft[2]	Market Share	County Population[3]	Aircraft Per 1,000 Residents
2000	780	217,533	0.3586%	556,678	1.4012
2001	796	211,446	0.3765%	564,241	1.4107
2002	792	211,244	0.3749%	576,532	1.3737
2003	785	209,606	0.3745%	587,049	1.3372
2004	784	219,319	0.3575%	600,449	1.3057
2005	788	224,257	0.3514%	615,320	1.2806
2006	814	221,942	0.3668%	628,632	1.2949
2007	837	231,606	0.3614%	638,978	1.3099
2008	834	228,664	0.3647%	646,879	1.2893
2009	787	223,876	0.3515%	655,279	1.2010
2010	780	223,370	0.3492%	662,564	1.1772
2011	762	220,453	0.3457%	669,416	1.1383
2012	707	209,034	0.3382%	672,444	1.0514
2013	645	199,927	0.3226%	674,221	0.9567
2014	605	198,880	0.3042%	690,834	0.8758
Constant Market Share of U.S. Active Aircraft Projection (AAGR = 0.36%)					
2020	607	199,410	0.3042%	780,244	0.7775
2025	614	201,970	0.3042%	835,325	0.7355
2035	652	214,260	0.3042%	932,091	0.6993
Reclaim 15-Year Average Market Share of U.S. Active Aircraft Projection (AAGR = 1.08%)					
2020	632	199,410	0.3167%	780,244	0.8094
2025	665	201,970	0.3292%	835,325	0.7960
2035	758	214,260	0.3537%	932,091	0.8131
Constant Ratio of Aircraft per 1,000 County Residents (AAGR = 1.44%)					
2020	683	199,410	0.3427%	780,244	0.8758
2025	732	201,970	0.3622%	835,325	0.8758
2035	816	214,260	0.3810%	932,091	0.8758
Reclaim 15-Year Average Ratio of Aircraft per 1,000 County Residents (AAGR =3.08%)					
2020	752	199,410	0.3770%	780,244	0.9636
2025	878	201,970	0.4348%	835,325	1.0514
2035	1,144	214,260	0.5337%	932,091	1.2269
Selected Projection (AAGR = 1.34%)					
2020	***620***	199,410	0.3109%	780,244	0.7946
2025	***680***	201,970	0.3367%	835,325	0.8141
2035	***800***	214,260	0.3734%	932,091	0.8583

[1]County Aircraft Registrations from FAA Aircraft Registration Database
[2]U.S. Active Aircraft from FAA Aerospace Forecasts – Fiscal Years 2015-2035
[3]Historical population from the US Census Bureau - Population division; Population projections from New Mexico County Population Projections July 1, 2010 to July 1, 2040, Geospatial and Population Studies Group, University of New Mexico. Released November 2012

The selected forecast of registered aircraft considers slow growth in the short-term with slightly accelerated growth by the longer term. By 2035, 800 county aircraft registrations are forecast. This figure is below the high registration total of 837 realized in 2007.

The registered aircraft projection is one data point to be used in the development of a based aircraft forecast. The following section will present several potential based aircraft forecasts as well as the selected based aircraft master plan forecast.

Based Aircraft Forecasts

Determining the number of based aircraft at an airport can be a challenging task. Aircraft storage can be somewhat transient in nature, meaning aircraft owners can and do move their aircraft. Some aircraft owners may store their aircraft at an airport for only part of the year. For many years, the FAA did not require based aircraft records; therefore, historical records are often incomplete or non-existent. For this study, the Sunport provided based aircraft counts beginning in 2006. As of 2014, there were 165 aircraft based at the Sunport.

The FAA TAF is an initial forecast source for based aircraft at airports. The 2015 TAF estimated that there were 174 based aircraft in 2014, which was forecast to grow to 268 by 2035 for an annual growth rate of 2.08 percent. **Table 2T** shows the FAA TAF history and forecasts of based aircraft. As can be seen, the 2015 TAF overestimates the current number of based aircraft by nine aircraft. Form 5010 is the FAA *Airport Master Record* for an airport, and it presents a single year based aircraft figure. In 2014, Form 5010 for the Sunport identified 172 based aircraft. Obviously, there is a range of based aircraft that have been reported for the Airport.

TABLE 2T
Existing Based Aircraft Forecasts
Albuquerque International Sunport

	HISTORY			FORECAST		
	2006	2010	2014	2020	2025	2035
Actual Based Aircraft	271	175	165			
FAA TAF 2015	360	201	174	196	218	268
Form 5010 Airport Master Record			172			

TAF - Terminal Area Forecast

Several forecasts of based aircraft for the Sunport have been developed. As with forecasts of registered aircraft, the goal is to develop a planning envelope of reasonable forecasts, then select a 20-year planning forecast for use in this study.

Table 2U considers several market share forecasts for based aircraft utilizing the previously developed forecast of registered aircraft in the county. In 2014, the Sunport, with 165 based aircraft, accounted for 27.27 percent of the registered aircraft in the county. By maintaining this percent as a constant, a long-term forecast of based aircraft emerges which results in 218 based aircraft by 2035. A second projection considers a modestly decreasing market share of the county's registered aircraft. This forecast

results in 184 based aircraft by 2035. A third projection shown utilizes the 2015 TAF projected annual growth rate of 2.08 percent which has a 2035 forecast of 268 based aircraft.

TABLE 2U
Based Aircraft Forecast
Albuquerque International Sunport

Year	Bernalillo County Registered Aircraft	Based Aircraft	Market Share
2006	814	271	33.29%
2007	837	265	31.66%
2008	834	210	25.18%
2009	787	201	25.54%
2010	780	175	22.44%
2011	762	175	22.97%
2012	707	175	24.75%
2013	645	165	25.58%
2014	605	165	27.27%
Constant Share Projection (AAGR 1.34%)			
2020	620	169	27.27%
2025	680	185	27.27%
2035	800	218	27.27%
Declining Share Projection (AAGR 0.52%)			
2020	620	161	26.00%
2025	680	170	25.00%
2035	800	184	23.00%
TAF Growth Rate (AAGR =2.08%)			
2020	620	196	31.61%
2025	680	218	32.06%
2035	800	268	33.50%
Selected Planning Forecast (AAGR 1.38%)			
2020	620	***170***	27.42%
2025	680	***190***	27.94%
2035	800	***220***	27.50%

AAGR: Average Annual Growth Rate

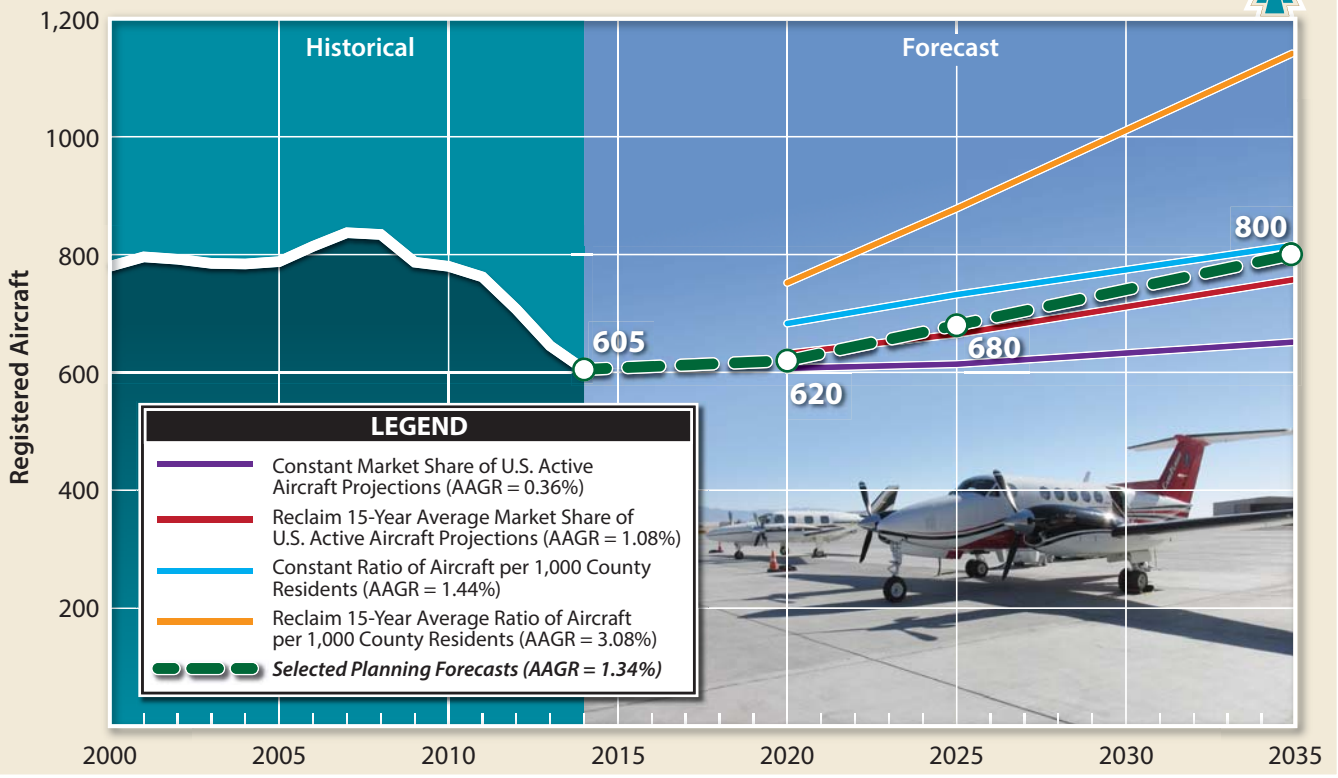
The three new forecasts represent the reasonable planning envelope. The selected forecast is closest to the constant market share of registered aircraft forecast. In the next five years, 170 based aircraft are projected. In 10 years, 190 are projected, and by 2035, 220 based aircraft are projected. **Exhibit 2L** illustrates both the registered and the based aircraft forecast.

BASED AIRCRAFT FLEET MIX

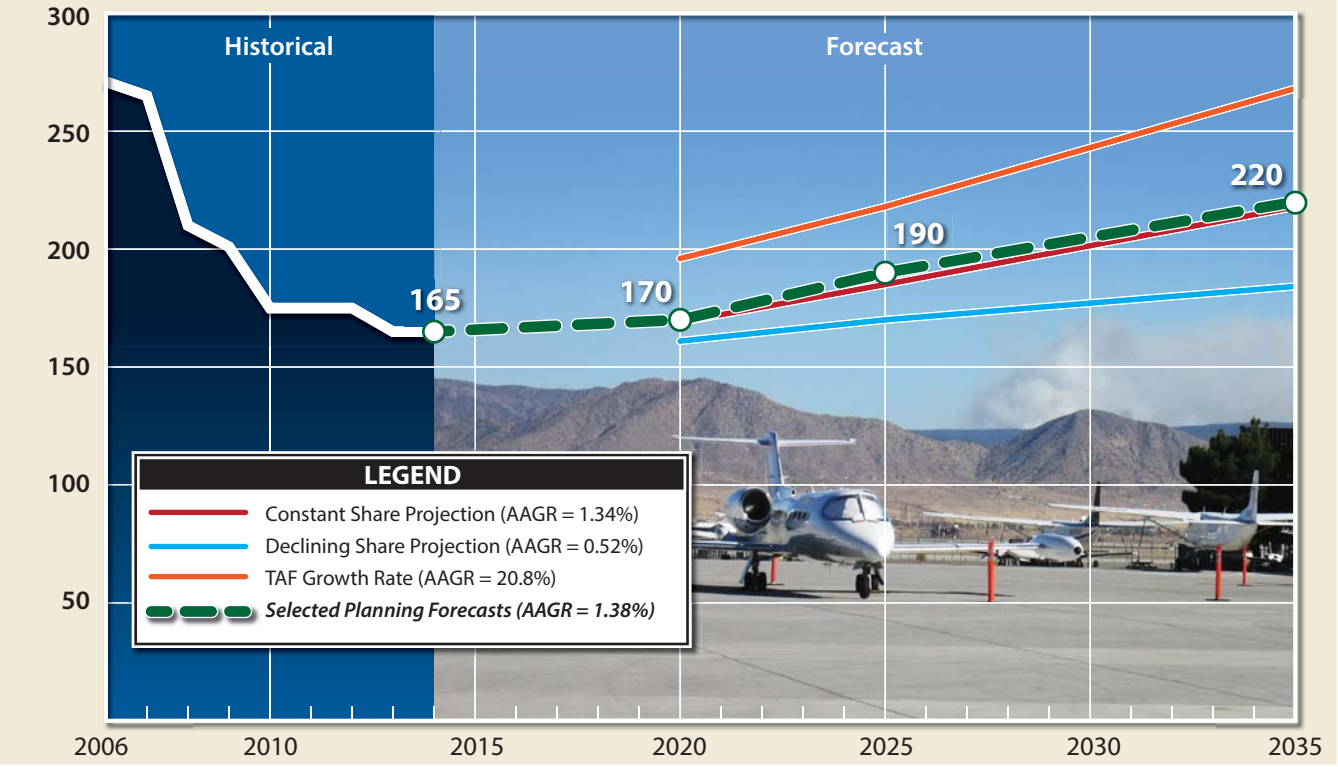
The fleet mix of based aircraft is oftentimes more important to airport planning and design than the total number of aircraft. For example, the presence of one or a few large business jets can impact design standards for the runway and taxiway system more than many smaller single engine piston-powered aircraft.

The based aircraft fleet mix forecast for the Sunport is presented in **Table 2V**. It has been developed based on local aircraft type usage and national trends as presented in FAA *Aerospace Forecasts - Fiscal*

REGISTERED AIRCRAFT - BERNALILLO COUNTY



BASED AIRCRAFT



- County Aircraft Registrations from FAA Aircraft Registration Database
- U.S. Active Aircraft from FAA Aerospace Forecasts – Fiscal Years 2015-2035
- Historical population from the US Census Bureau - Population division; Population projections from New Mexico County Population Projections July 1, 2010 to July 1, 2040, Geospatial and Population Studies Group, University of New Mexico. Released November 2012

AAGR: Average Annual Growth Rate

Years 2015-2035. The FAA expects business jets will continue to be the fastest growing general aviation aircraft type in the future. The Sunport is well-positioned to accommodate business jets in the future; nevertheless, smaller piston-powered aircraft will continue to have a presence at the Sunport.

TABLE 2V
Based Aircraft Fleet Mix
Albuquerque International Sunport

	EXISTING		FORECAST					
Aircraft Type	**2014**	**%**	**2020**	**%**	**2025**	**%**	**2035**	**%**
Single Engine	60	36.36%	61	35.88%	64	33.68%	70	31.82%
Multi-Engine	49	29.70%	49	28.82%	51	26.84%	55	25.00%
Turboprop	30	18.18%	31	18.24%	35	18.42%	41	18.64%
Jet	19	11.52%	21	12.35%	27	14.21%	36	16.36%
Helicopter	7	4.24%	8	4.71%	13	6.84%	18	8.18%
Totals	**165**	**100.00%**	**170**	**100.00%**	**190**	**100.00%**	**220**	**100.00%**

Source: Airport Records; Coffman Associates Analysis

There are currently 19 business jets based at the Sunport which are forecast to increase to 36 by 2035. Turboprops are forecast to increase from 30 currently to 41 by 2035. Helicopters based at the Sunport are forecast to grow from seven currently to 18 by the long-term. Single and multi-engine piston aircraft are forecast to increase slightly over the 20-year forecast period.

GENERAL AVIATION OPERATIONS

General aviation (GA) operations are classified by the airport traffic control tower (ATCT) as either local or itinerant. A local operation is a take-off or landing performed by an aircraft that operates within sight of an airport, or which executes simulated approaches or touch-and-go operations at an airport. Itinerant operations are those performed by aircraft with a specific origin or destination away from an airport. Generally, local operations are characterized by training operations. Typically, itinerant operations increase with business and commercial use, since business aircraft are operated on a higher frequency.

Itinerant Operations

Table 2W depicts general aviation itinerant operations at the Sunport from 2000 through 2014. General aviation itinerant operations have experienced a declining trend since the most recent national recession in 2008; however, 2014 saw a reversal of that trend. National general aviation itinerant operations have been declining since at least 2000 but have taken a steeper decline since the beginning of the recession and have yet to recover; however, the FAA forecasts a reversal by 2015. From 2014 through 2035, the FAA forecasts an annual growth rate of 0.4 percent for itinerant general aviation operations.

The FAA forecasts an annual growth rate of 0.4 percent for itinerant general aviation operations.

TABLE 2W
General Aviation Itinerant Operations Forecast
Albuquerque International Sunport

Year	ABQ GA Itinerant Ops[1]	US GA Itinerant Ops[2]	Market Share Itinerant Ops	ABQ Based Aircraft[3]	Itinerant Ops Per Based Aircraft
2000	63,184	22,844,100	0.2766%		
2001	59,637	21,432,900	0.2782%		
2002	67,647	21,450,500	0.3154%		
2003	59,285	20,231,300	0.2930%		
2004	41,353	20,007,200	0.2067%		
2005	38,953	19,303,200	0.2018%		
2006	39,677	18,707,100	0.2121%	271	146
2007	40,976	18,575,200	0.2206%	265	155
2008	37,468	17,492,700	0.2142%	210	178
2009	29,864	15,571,100	0.1918%	201	149
2010	27,927	14,863,900	0.1879%	175	160
2011	26,144	14,527,900	0.1800%	175	149
2012	26,679	14,521,700	0.1837%	175	152
2013	26,422	14,177,400	0.1864%	165	160
2014	28,548	13,977,500	0.2042%	165	173
Constant Market Share of 2014 Percent (AAGR = 0.37%)					
2020	29,022	14,209,500	0.2042%	170	171
2025	29,614	14,499,400	0.2042%	190	156
2035	30,878	15,118,400	0.2042%	220	140
Increasing Market Share (AAGR = 1.15%)					
2020	29,840	14,209,500	0.2100%	170	176
2025	31,899	14,499,400	0.2200%	190	168
2035	36,284	15,118,400	0.2400%	220	165
Constant Operations Per Based Aircraft (AAGR = 1.38%)					
2020	29,413	14,209,500	0.2070%	170	173
2025	32,873	14,499,400	0.2267%	190	173
2035	38,064	15,118,400	0.2518%	220	173
Increasing Operations Per Based Aircraft (AAGR = 2.08%)					
2020	29,750	14,209,500	0.2094%	170	175
2025	34,200	14,499,400	0.2359%	190	180
2035	44,000	15,118,400	0.2910%	220	200
2015 FAA TAF Projections (AAGR = 0.50%)					
2020	28,578	14,209,500	0.2011%	170	168
2025	29,592	14,499,400	0.2041%	190	156
2035	31,725	15,118,400	0.2098%	220	144
Selected Planning Forecast (AAGR = 1.14%)					
2020	***29,300***	14,209,500	0.2062%	170	172
2025	***31,600***	14,499,400	0.2179%	190	166
2035	***36,200***	15,118,400	0.2394%	220	165

[1]Historical data from ATCT records as reported to FAA.
[2]FAA Forecasts Fiscal Years 2015-2035
[3]Airport records
AAGR = Average Annual Growth Rate from 2014 to 2035
Source: Coffman Associates analysis

Prior to 2003, the Sunport averaged more than 60,000 annual itinerant general aviation operations. From 2004 through 2008, the average was around 40,000 annual itinerant general aviation operations. From 2009 to 2014, itinerant general aviation operations leveled off around 28,000 annual operations.

Five forecasts are considered to develop the planning envelope for future local general aviation operations. The planning envelope is intended as the range where the forecast may reasonably fall. The first two forecasts consider future itinerant general aviation operations in comparison to the Sunport's market share of national itinerant general aviation operations as forecast by the FAA. The first of these two considers the Sunport maintaining a constant market share (0.2042 percent) of national itinerant general aviation operations which yields 30,878 operations by 2035. The next considers the Sunport beginning to regain market share with a modestly increasing share of national itinerant general aviation operations. By the long-term, the increasing market share forecast results in 36,284 operations.

The next two projections consider the relationship between based aircraft and itinerant general aviation operations. In 2014, there were 173 itinerant general aviation operations per based aircraft. When maintaining this ratio, the projection results in 38,064 itinerant general aviation operations by 2035. This represents an annual growth rate of 1.38 percent. The second forecast considers an increasing number of itinerant general aviation operations per based aircraft. By 2035, itinerant general aviation operations reach 44,000, which correspond to 200 operations per based aircraft and an annual growth rate of 2.08 percent.

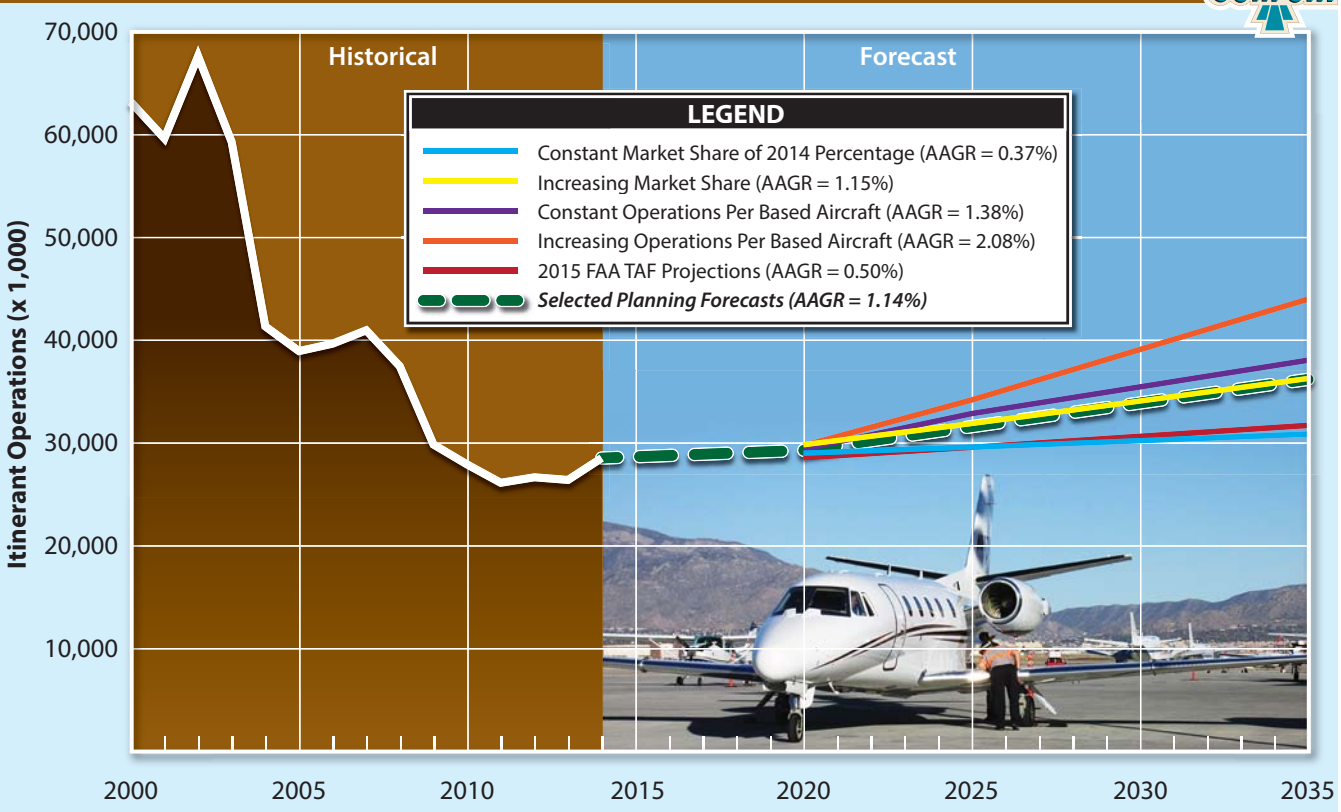
The 2015 FAA TAF also presents an itinerant general aviation operation forecast which is included in the table. The TAF forecasts a growth rate of 0.50 percent annually. This results in a 2035 itinerant general aviation operations projection of 31,725. It should be noted that the TAF estimate for 2014 itinerant general aviation operations was 27,750 which was below the actual figure documented by the control tower.

The selected planning forecast is a rounded average of the five forecasts. In the next five years, itinerant general aviation operations are forecast to reach 29,300. In 10 years, 31,600 itinerant general aviation operations are forecast and by 2035, 36,200 itinerant general aviation operations are projected. **Exhibit 2M** presents both the itinerant and local general aviation operations forecast.

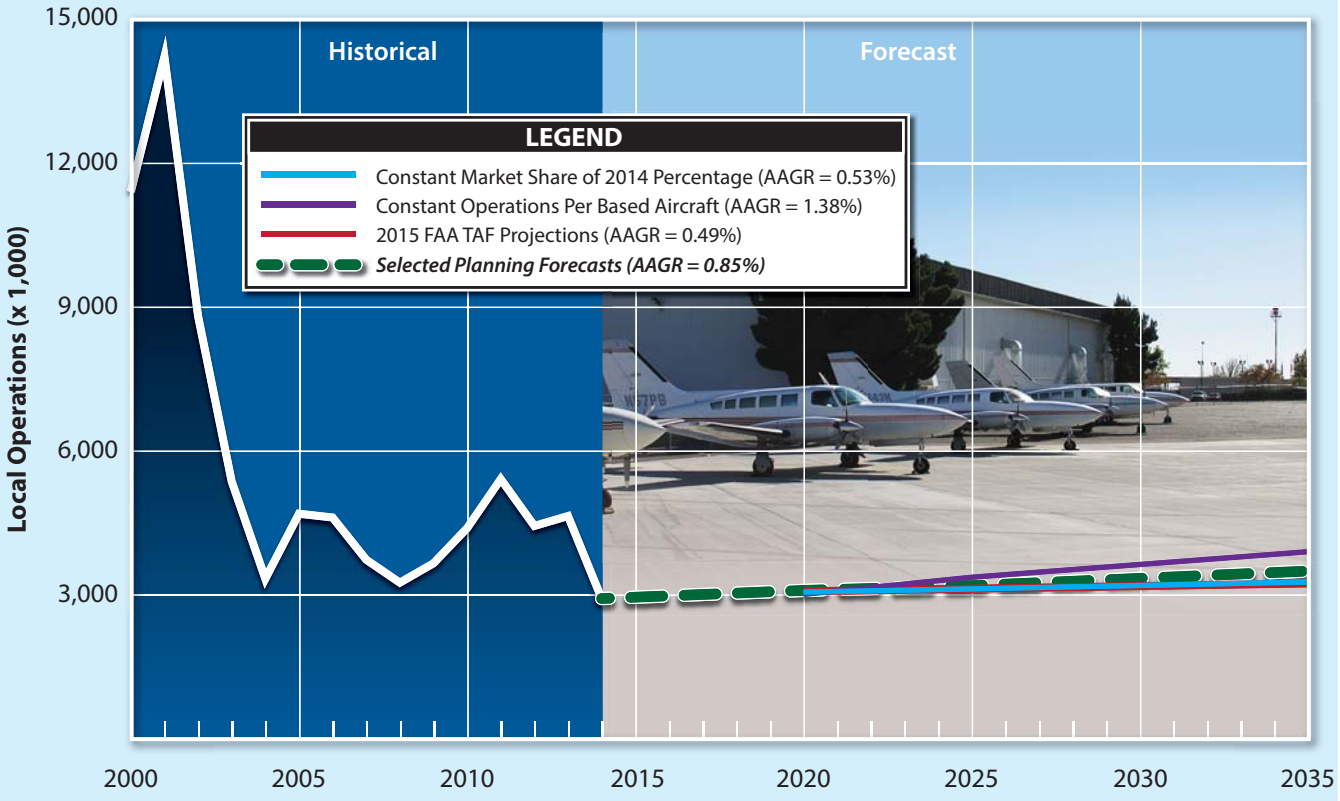
Local Operations

A similar methodology was utilized to forecast local general aviation operations. **Table 2X** depicts the history of local operations at the Sunport and examines its historic market share of GA local operations at towered airports in the United States. Historical local operations range from a low of 2,930 in 2014 to a high of 14,224 in 2001. As a busy commercial service airport, it is not unusual to have a low percentage of local operations. This is especially true at the Sunport where large military aircraft are frequently in the traffic pattern.

GENERAL AVIATION ITINERANT OPERATIONS



GENERAL AVIATION LOCAL OPERATIONS



Historical data from ATCT records as reported to FAA
AAGR: Average Annual Growth Rate from 2014 to 2035

TABLE 2X
General Aviation Local Operations Forecast
Albuquerque International Sunport

Year	ABQ GA Local Ops[1]	US GA Local Ops[2]	Market Share Local Ops	ABQ Based Aircraft[3]	Local Ops Per Based Aircraft
2000	11,409	17,034,400	0.0670%		
2001	14,224	16,193,600	0.0878%		
2002	8,819	16,172,800	0.0545%		
2003	5,372	15,292,700	0.0351%		
2004	3,343	14,960,400	0.0223%		
2005	4,698	14,843,600	0.0317%		
2006	4,620	14,365,400	0.0322%	271	17
2007	3,740	14,556,800	0.0257%	265	14
2008	3,261	14,081,200	0.0232%	210	16
2009	3,665	12,448,000	0.0294%	201	18
2010	4,398	11,716,300	0.0375%	175	25
2011	5,420	11,437,000	0.0474%	175	31
2012	4,444	11,608,300	0.0383%	175	25
2013	4,650	11,748,300	0.0396%	165	28
2014	2,930	11,674,100	0.0251%	165	18
Constant Market Share of 2014 Percent (AAGR = 0.53%)					
2020	3,064	12,207,100	0.0251%	170	18
2025	3,131	12,474,700	0.0251%	190	16
2035	3,275	13,048,100	0.0251%	220	15
Constant Operations Per Based Aircraft (AAGR = 1.38%)					
2020	3,019	12,207,100	0.0247%	170	18
2025	3,374	12,474,700	0.0270%	190	18
2035	3,907	13,048,100	0.0299%	220	18
2015 FAA TAF Projections (AAGR = 0.49%)					
2020	3,080	12,207,100	0.0252%	170	18
2025	3,135	12,474,700	0.0251%	190	17
2035	3,245	13,048,100	0.0249%	220	15
Selected Planning Forecast (AAGR = 0.85%)					
2020	***3,100***	12,207,100	0.0254%	170	18
2025	***3,200***	12,474,700	0.0257%	190	17
2035	***3,500***	13,048,100	0.0268%	220	16

[1]Historical data from ATCT records as reported to FAA.
[2]FAA Forecasts Fiscal Years 2015-2035
[3]Airport records
AAGR = Average Annual Growth Rate from 2014 to 2035
Source: Coffman Associates analysis

As with national itinerant operations, local operations have been declining for some time. The FAA TAF and the national projections estimate a modest annual growth rate going forward of approximately 0.5 percent. Since significant growth in the local general aviation operations category is not anticipated, three forecasts are considered.

The first two forecasts of local general aviation operations consider the Sunport's market share of national local general aviation operations as counted by the FAA. The first maintains the Sunport's 2014 market share at 0.0251 percent resulting in 3,275 local general aviation operations by 2035. This forecast

results in an annual growth rate of 0.53 percent. The second forecast applies a constant number of local general aviation operations per based aircraft. This forecast results in 3,907 local general aviation operations by 2035 and an annual growth rate of 1.38 percent.

The 2015 FAA TAF projection is also presented in the table. The TAF identifies a 2035 projection of 3,245 local general aviation operations. This is an annual growth rate of 0.49 percent.

The selected forecast is the approximate average of the three new forecasts presented. The planning forecast for local general aviation operations considers 3,100 by 2020, 3,200 by 2025, and 3,500 by 2035. The average annual growth rate is 0.85 percent.

OTHER AIR TAXI & MILITARY OPERATIONS FORECASTS

Air taxi operations as reported by the air traffic control tower (ATCT) include commuter passenger, commuter cargo, as well as for-hire general aviation operations. Some operations by aircraft operated under fractional ownership programs are also counted as air taxi operations. Since the airline and cargo operations have been forecast, this section reviews the growth potential for the "other air taxi" operations.

In 2014, there were a total of 12,304 other air taxi operations. Because the other air taxi operations are more closely related to corporate aircraft flying, they were projected to increase at the rate of general aviation turboprops and jets. The resulting forecast is also presented in **Table 2Y**.

TABLE 2Y
Other Air Taxi Operations
Albuquerque International Sunport

Year	Other Air Taxi Operations
2014	12,304
Forecast (AAGR = 1.14%)	
2020	13,200
2025	13,900
2035	15,800

MILITARY ACTIVITY

Military operations are an important factor in air traffic activity at the Sunport because of the joint use agreement with Kirtland Air Force Base. Kirtland is home to the 58th Special Operations Wing (58th SOW), an Air Education and Training Command (AETC) unit that provides formal aircraft type/model/series training to the Air Force Special Operations Command (AFSOC) special operations forces (SOF), and Air Combat Command (ACC) combat search and rescue (CSAR) communities. The 58th SOW operates the MC-130H Combat Talon II, HC-130P/N King, HC-130J, MC-130J, UH-1N Huey, HH-60G Pave Hawk, and CV-22 Osprey aircraft. The 150th Special Operations Wing of the New Mexico Air National Guard, an Air Combat Command (ACC)-gained unit, is also home-based at Kirtland.

In 2014, there were 18,913 military operations. This total represents the lowest level the Sunport has experienced since at least 2000. Developing a reliable forecast of military activity is inherently difficult, primarily because the military mission can change rapidly. Generally during peace time, civilian airports will experience higher levels of military operations.

In 2014, there were 18,913 military operations.

When there are overseas commitments, many of those pilots and equipment will be out of the country. The FAA recognizes these challenges to forecasting military activity and, therefore, provides only a flat forecast for both local and itinerant military activity.

Table 2Z presents the history of military activity at the Sunport. The forecast presented considers a zero-growth scenario of 18,900 annual military operations. This is the rounded military operations from the FAA TAF. These operations are then categorized as either local or itinerant based on historical trends.

TABLE 2Z
Military Operations Forecast
Albuquerque International Sunport

Year	Military Itinerant	Military Local	Total
2000	22,232	20,076	42,308
2001	22,338	23,440	45,778
2002	29,298	17,599	46,897
2003	21,907	11,753	33,660
2004	21,053	7,682	28,735
2005	23,683	6,557	30,240
2006	23,509	7,258	30,767
2007	18,956	4,715	23,671
2008	18,105	3,830	21,935
2009	17,891	5,198	23,089
2010	16,878	7,538	24,416
2011	15,534	7,243	22,777
2012	17,147	7,216	24,363
2013	15,509	5,297	20,806
2014	16,683	2,230	18,913
Military Operations Forecast (AAGR - 0.0%)			
2020	16,100	2,800	18,900
2025	16,100	2,800	18,900
2035	16,100	2,800	18,900

Note: History from ATCT records as reported to FAA
Source: Coffman Associates analysis

FORECAST COMPARISON TO THE FAA TAF

The FAA will review the forecasts presented in this master plan for comparison to the *Terminal Area Forecast*. The local Airports District Office (ADO) of the FAA can approve the forecasts if they do not differ by more than 10 percent in the first five years and 15 percent for years 6-10. If the master planning forecasts exceed these parameters, then the forecasts must be forwarded to FAA headquarters in Washington, D.C., for further review. Any deviation from these thresholds will require specific local documentation. **Table 2AA** presents the direct comparison of the master planning forecasts with the TAF published in January 2015.

The reason the FAA allows this differential is because the TAF forecasts are not meant to replace forecasts developed locally (i.e., in this Master Plan). While the TAF can provide a point of reference or comparison, their purpose is much broader in defining FAA national workload measures.

TABLE 2AA
Forecast Comparison to the 2015 FAA Terminal Area Forecast (TAF)
Albuquerque International Sunport

	Baseline 2014	2020	2025	2035	AAGR 2014-2035
Passenger Enplanements					
Master Plan Forecast	2,446,388	2,490,000	2,750,000	3,330,000	1.48%
FAA TAF	2,395,478	2,415,367	2,665,158	3,230,043	1.51%
% Difference	2.1%	3.1%	3.2%	3.1%	
Commercial Operations					
Master Plan Forecast[1]	76,678	80,300	85,800	97,400	1.15%
FAA TAF	81,777	83,659	89,564	105,770	1.23%
% Difference	-6.2%	-4.0%	-2.6%	-7.9%	
Total Operations					
Master Plan Forecast	130,069	131,600	139,500	156,000	0.87%
FAA TAF	131,604	134,243	141,217	159,666	0.97%
% Difference	-1.2%	-2.0%	-1.2%	-2.3%	
Based Aircraft					
Master Plan Forecast	165	170	190	220	1.45%
FAA TAF	174	196	218	268	2.18%
% Difference	-5.2%	-13.3%	-12.8%	-17.9%	

[1]Includes air carrier, commuter, air cargo, and a portion of air taxi.
Source: Coffman Associates analysis

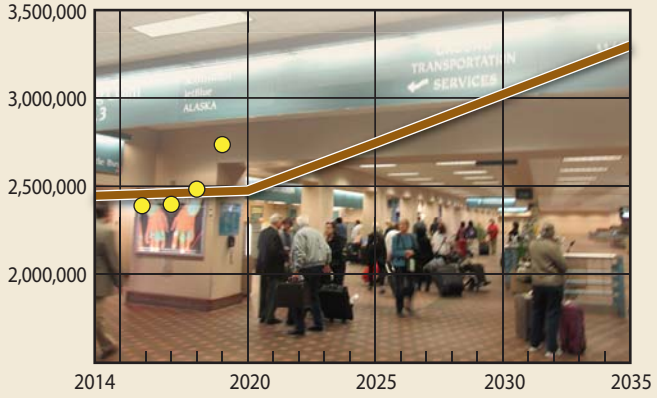
In the five- and ten-year planning horizons, enplanements and operations are within the FAA tolerance in relation to the TAF. In the five-year horizon, based aircraft is forecast at 13.3 percent below the FAA TAF. This is a direct result of the TAF 2014 baseline figure being nine aircraft higher than the actual figure of 165. The ten-year based aircraft projection is within the 15 percent FAA tolerance, even with the discrepancy in the baseline figure.

FORECAST SUMMARY

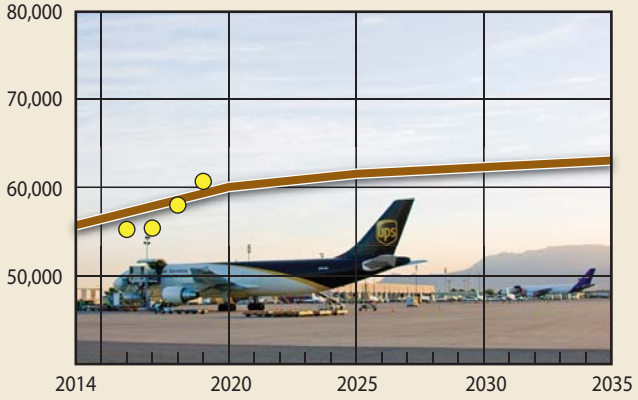
This chapter has outlined the various activity levels that might reasonably be anticipated over the planning period. **Exhibit 2N** is a summary of the aviation forecasts prepared in this chapter. Actual activity is included for 2014, which was the base year for these forecasts. As mentioned earlier, actual 2018 statistics has been added to the summary to provide a more current activity reference.

	Base Year 2014	Actual 2018	2020	2025	2035
TOTAL ENPLANEMENTS					
ANNUAL ENPLANEMENTS	***2,446,388***	***2,737,309***	***2,490,000***	***2,750,000***	***3,330,000***
TOTAL AIR					
AIR CARGO (tons)	***55,702***	***60,630***	***60,043***	***61,534***	***63,043***
ANNUAL OPERATIONS					
ITINERANT OPERATIONS					
Air Carrier	57,172	58,858	56,600	61,000	70,000
Air Cargo	10,202	10,188	10,500	10,900	11,600
Other Air Taxi	12,304	15,982	13,200	13,900	15,800
General Aviation	28,548	30,701	29,300	31,600	36,200
Military	16,683	14,540	16,100	16,100	16,100
TOTAL ITINERANT OPERATIONS	*124,909*	*130,269*	*125,700*	*133,500*	*149,700*
LOCAL OPERATIONS					
General Aviation	2,930	8,845	3,100	3,200	3,500
Military	2,230	4,930	2,800	2,800	2,800
Total Local Operations	*5,160*	*13,775*	*5,900*	*6,000*	*6,300*
TOTAL OPERATIONS	***130,069***	***144,044***	***131,600***	***139,500***	***156,000***
BASED AIRCRAFT	***165***	***158***	***170***	***190***	***220***

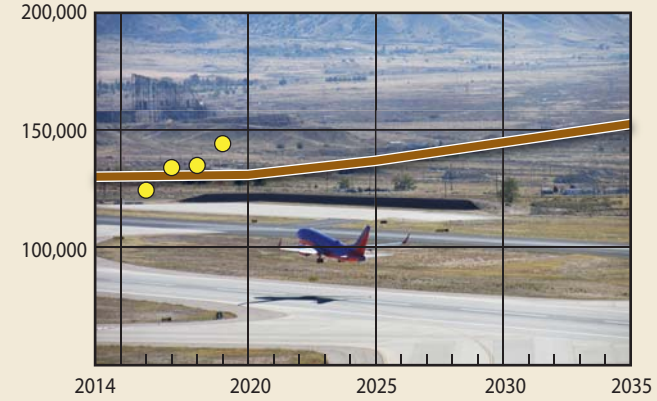
PASSENGER ENPLANEMENTS FORECAST



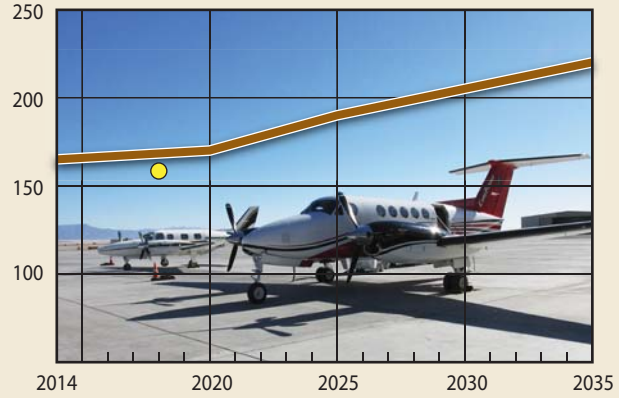
AIR CARGO SHIPMENT FORECAST (TONS)



AIRCRAFT OPERATIONS FORECAST



BASED AIRCRAFT FORECAST



○ Denotes annual activity since the base year.

In 2014, the Sunport had 2.45 million passenger enplanements. Enplanements had decreased each year since 2008. Enplanements are forecast to reach 2.49 million within the next five years and 3.33 million within the next 20 years. Overall, airport operations are forecast to continue to grow from 130,069 in 2014 to 156,000 by 2035. Based aircraft are forecast to grow from 165 in 2014 to 220 by 2035.

Projections of aviation demand will be influenced by unforeseen factors and events in the future. In the recent past, factors such as the terrorist attacks of September 11, 2001, and two economic recessions impacted aviation demand. Nonetheless, the forecasts developed for this master planning effort are considered reasonable for planning purposes. The FAA has review and approved these forecasts for planning purposes in May 2015. A copy of the FAA approval letter is included in **Appendix C.**

AIRCRAFT/AIRPORT/RUNWAY CLASSIFICATION

The FAA has established several aircraft classification systems that group aircraft types based on their performance (approach speed in landing configuration) and design characteristics (wingspan and landing gear configuration). These classification systems are used to determine the appropriate airport design standards for specific airport elements such as runways, taxiways, taxilanes, and aprons.

AIRCRAFT CLASSIFICATION

The selection of appropriate FAA design standards for the development and location of airport facilities is based primarily upon the characteristics of the aircraft which are currently using or are expected to use an airport. The critical design aircraft is used to define the design parameters for an airport. The design aircraft may be a single aircraft type or a composite aircraft representing a collection of aircraft. The design aircraft is classified by three parameters: Aircraft Approach Category (AAC), Airplane Design Group (ADG), and Taxiway Design Group (TDG). FAA AC 150/5300-13A, *Airport Design*, describes the following airplane classification systems, the parameters of which are presented on **Exhibit 2P**.

Aircraft Approach Category (AAC): A grouping of aircraft based on a reference landing speed (V_{REF}), if specified, or if V_{REF} is not specified, 1.3 times stall speed (V_{SO}) at the maximum certificated landing weight. V_{REF}, V_{SO}, and the maximum certificated landing weight are those values as established for the aircraft by the certification authority of the country of registry.

The AAC generally refers to the approach speed of an aircraft in landing configuration. The higher the approach speed, the more restrictive the applicable design standards. The AAC, depicted by a letter A through E, is the aircraft approach category and relates to aircraft approach speed (operational characteristic). The AAC generally applies to runways and runway-related facilities, such as runway width, runway safety area (RSA), runway object free area (ROFA), runway protection zone (RPZ), and separation standards.

AIRCRAFT APPROACH CATEGORY (AAC)

Category	Approach Speed
A	less than 91 knots
B	91 knots or more but less than 121 knots
C	121 knots or more but less than 141 knots
D	141 knots or more but less than 166 knots
E	166 knots or more

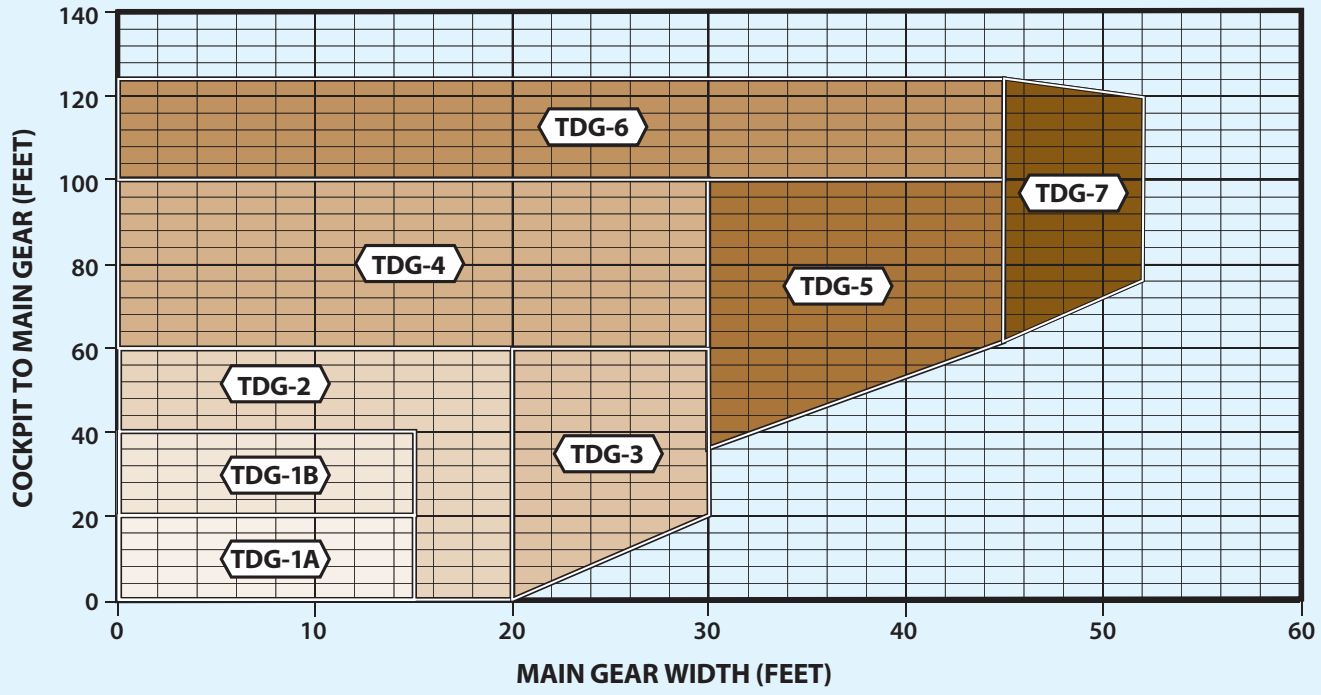
AIRPLANE DESIGN GROUP (ADG)

Group #	Tail Height (ft)	Wingspan (ft)
I	<20	<49
II	20-<30	49-<79
III	30-<45	70-<118
IV	45-<60	118-<171
V	60-<66	171-<214
VI	66-<80	214-<262

VISIBILITY MINIMUMS

RVR (ft)	Flight Visibility Category (statute miles)
VIS	3-mile or greater visibility minimums
5,000	Lower than 3 miles but not lower than 1-mile
4,000	Lower than 1-mile but not lower than ¾-mile (APV ≥ ¾ but < 1-mile)
2,400	Lower than ¾-mile but not lower than ½-mile (CAT-I PA)
1,600	Lower than ½-mile but not lower than ¼-mile (CAT-II PA)
1,200	Lower than ¼-mile (CAT-III PA)

TAXIWAY DESIGN GROUP (TDG)



KEY

APV: Approach Procedure with Vertical Guidance
PA: Precision Approach
RVR: Runway Visual Range
TDG: Taxiway Design Group

Source: FAA AC 150/5300-13A, Change 1, Airport Design

Airplane Design Group (ADG): The ADG, depicted by a Roman numeral I through VI, is a classification of aircraft which relates to aircraft wingspan or tail height (physical characteristic). When the aircraft wingspan and tail height fall in different groups, the higher group is used. The ADG influences design standards for taxiway safety area (TSA), taxiway object free (TOFA), taxilane object free area, apron wingtip clearance, and various separation distances.

Taxiway Design Group (TDG): A classification of airplanes based on outer-to-outer Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance. The TDG relates to the undercarriage dimensions of the design aircraft. The taxiway design elements determined by the application of the TDG include the taxiway width, taxiway edge safety margin, taxiway shoulder width, taxiway fillet dimensions, and, in some cases, the separation distance between parallel taxiways/taxilanes. Other taxiway elements, such as the taxiway safety area (TSA), taxiway/taxilane object free area (TOFA), taxiway/taxilane separation to parallel taxiway/taxilanes or fixed or movable objects, and taxiway/taxilane wingtip clearances are determined solely based on the wingspan (ADG) of the design aircraft utilizing those surfaces. It is appropriate for taxiways to be planned and built to different TDG standards based on expected use.

Exhibit 2Q summarizes the classification of the most common jet aircraft in operation today. Generally, business jets will fall in approach categories B and C, while commercial aircraft will fall in C and D. Business jets typically have slower approach speeds as compared to commercial transport aircraft. Recreational and business piston and turboprop aircraft will generally fall in approach categories A and B and airplane design groups I and II.

AIRPORT AND RUNWAY CLASSIFICATION

These classifications, along with the aircraft classifications defined previously, are used to determine the appropriate FAA design standards to which the airfield facilities are to be designed and built.

***Airport Reference Code (ARC)*:** An airport designation that signifies the airport's highest Runway Design Code (RDC), minus the third (visibility) component of the RDC. The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely on the airport. The current Airport Layout Plan (ALP) for the Sunport, which will be updated as part of this master planning effort, identifies an ARC of D-V currently and in the future.

Runway Design Code (RDC): A code signifying the design standards to which the runway is to be built. The RDC is based upon planned development and has no operational component.

The AAC, ADG, and runway visual range (RVR) are combined to form the RDC of a given runway. The RDC provides the information needed to determine certain design standards that apply. The first component, depicted by a letter, is the AAC and relates to aircraft approach speed (operational characteristics). The second component, depicted by a Roman numeral, is the ADG and relates to either the aircraft wingspan or tail height (physical characteristics), whichever is most restrictive. The third component relates to the visibility minimums expressed by RVR values in feet of 1,200 (⅛-mile), 1,600 (¼-mile), 2,400

TURBINE AIRCRAFT CLASSIFICATION

AIRCRAFT	AAC	ADG	TDG
Eclipse 500	A	I	1
Premier 390	B	I	1
Beechjet 400, T-1, Hawker 400	B	I	1
Cessna 500, 501, Citation I, SP	B	I	1
Cessna Mustang 510	B	I	1
Cessna 525, 526, CitationJet, CJ1	B	I	1
Embraer Phenom 100	B	I	1
Falcon 10	B	I	1

AIRCRAFT	AAC	ADG	TDG
Cessna 525A (CJ2)	B	II	2
Cessna 525B (CJ3)	B	II	2
Cessna Citation II Bravo 550, SP	B	II	2
Cessna Citation V, Ultra, Encore 560	B	II	2
Cessna 560 XLS	B	II	2
Cessna Citation III, VI, VII, 650	B	II	2
Cessna Citation Sovereign 680	B	II	3
Falcon 20**, 50,** 900, 2000	B	II	2
Embraer Phenom 300	B	II	2

AIRCRAFT	AAC	ADG	TDG
BAe HS 125-1, 2, 3, 400, 600	C	I	2
BAe HS 125, 700, 800, Hawker 800	C	I	2
Learjet 23, 24, 25, 28	C	I	1
Learjet 31 A/B	C	I	1
Learjet 35, 36, **45**, 55	C	I	2
Lear 60	C	I	4
IAI Westwind	C	I	2

AIRCRAFT	AAC	ADG	TDG
IAI Astra 1125	C	II	2
Cessna Citation 750 (X)	C	II	3
Challenger 300	C	II	3
Challenger 600, 601, 604	C	II	3
Lockheed 1329 Jetstar	C	II	3
Gulfstream III, G300, G-1159	C	II	3
Hawker 800XP, 1000, 4000	C	II	3
Falcon 900EX, F-Series	C	II	3
Embraer ERJ 135, 140, 145	C	II	3
Canadair CRJ 200, 700, 900	C	II	3

AIRCRAFT	AAC	ADG	TDG
Gulfstream G150	D	II	3
Gulfstream II, G200	D	II	3
Gulfstream IV, G400	D	II	3
IAI Galaxy, Gulfstream G200	D	II	3

AIRCRAFT	AAC	ADG	TDG
Global Express, 5000	C	III	3
Gulfstream V, 550, 650	C	III	3
Falcon 7FX	C	III	3
B727-200	C	III	5
B-737-100, 200, 300, 400, 500, 600, 700	C	III	3
MD-81, 82, 87, 90	C	III	4
A318, A319, A320	C	III	3
A321	C	III	5
Embraer 170, 175, 190, 195	C	III	3
B-737-800, 900	D	III	3
MD-83, 88	D	III	4

AIRCRAFT	AAC	ADG	TDG
B-707	C	IV	5
B-757-200	C	IV	5
B-767-200, 300	C	IV	5
B-787 -800	C	IV	5
B-777-200	C	V	6
A330-200F	C	V	5
A330-200, 300	C	V	6

AIRCRAFT	AAC	ADG	TDG
MD-11	D	IV	6
DC-10	D	IV	5
B-747-100,200,300,400	D	V	6
B-757-300	D	IV	5
B-777-300	D	V	6
A340-200,300,500,600	D	V	6
A350-900	D	V	6

AIRCRAFT	AAC	ADG	TDG
B-747 -8, F	D	VI	6
B-767-200ER, 300ER, 400	D	VI	5
A380-800	D	VI	7

KEY: **AAC** - Aircraft Approach Category (based on approach speed); **ADG** - Airplane Design Group (based on wingspan); **TDG** - Taxiway Design Group (based on width/length of landing gear)
Note: Plane pictured is in bolded text.

This page intentionally left blank

(½-mile), 4,000 (¾-mile), and 5,000 (1-mile). The RVR values approximate standard visibility minimums for instrument approaches to the runways. The third component should read "VIS" for runways designed for visual approach use only.

Approach Reference Code (APRC): A code signifying the current operational capabilities of a runway and associated parallel taxiway with regard to landing operations. Like the RDC, the APRC is composed of the same three components: the AAC, ADG, and RVR. The APRC describes the current operational capabilities of a runway under meteorological conditions where no special operating procedures are necessary, as opposed to the RDC which is based upon planned development with no operational component. The APRC for a runway is established based upon the minimum runway to taxiway centerline separation.

Departure Reference Code (DPRC): A code signifying the current operational capabilities of a runway and associated parallel taxiway with regard to takeoff operations. The DPRC represents those aircraft that can takeoff from a runway while any aircraft are present on adjacent taxiways, under meteorological conditions with no special operating conditions. The DPRC is similar to the APRC, but is composed of two components, ACC and ADG. A runway may have more than one DPRC depending on the parallel taxiway separation distance.

CRITICAL DESIGN AIRCRAFT

The selection of appropriate FAA design standards for the development and location of airport facilities is based primarily upon the characteristics of the aircraft which are currently using or are expected to use an airport. The critical design aircraft is used to define the design parameters for an airport. The design aircraft may be a single aircraft or a composite aircraft representing a collection of aircraft classified by the three parameters: AAC, ADG, and TDG. In the case of an airport with multiple runways, a design aircraft is selected for each runway.

The first consideration is the safe operation of aircraft likely to use an airport. Any operation of an aircraft that exceeds design criteria of an airport may result in either an unsafe operation or a lesser safety margin; however, it is not the usual practice to base the airport design on an aircraft that uses the airport infrequently.

The design aircraft is defined as the most demanding category of aircraft, or family of aircraft, which conducts at least 500 itinerant operations per year at an airport or the most demanding aircraft in regularly scheduled commercial service. Planning for future aircraft use is of particular importance since the design standards are used to plan separation distances between facilities. These future standards must be considered now to ensure that short-term development does not preclude the reasonable long-range potential needs of the airport.

According to FAA AC 150/5300-13A, *Airport Design*, "Airport designs based only on existing aircraft can severely limit the ability to expand the airport to meet future requirements for larger, more demanding aircraft. Airport designs that are based on large aircraft never likely to be served by the airport are not

economical." Selection of the current and future critical design aircraft must be realistic in nature and supported by current data and realistic projections.

AIRPORT DESIGN AIRCRAFT

The Sunport experiences frequent activity by both commercial service and business jets. The largest commercial passenger service jet currently in service at the Sunport is the Boeing 757 as operated by United Airlines. The largest commercial air cargo jet in service is the Airbus 300-600. The Sunport experiences activity by the largest business jets, including the Gulfstream V and Bombardier Global Express.

The FAA maintains the Traffic Flow Management System Count (TFMSC) database which documents certain aircraft operations at airports. Information is added to the TFMSC database when pilots file flight plans and/or when flights are detected by the National Airspace System, usually via radar. It includes documentation of commercial traffic (air carrier and air taxi), general aviation, and military aircraft. Due to factors, such as incomplete flight plans and limited radar coverage, TFMSC data does not account for all aircraft activity at an airport by a given aircraft type. Therefore, it is likely that there are more operations at the airport than are captured by this methodology. TFMSC data is available for activity at the Sunport and was utilized in this analysis.

It is recommended that the design aircraft be changed from D-V-6 (Boeing 747) to D-IV-5.

Exhibit 2R presents the TFMSC annual activity from 2005 through 2014. Aircraft in AAC D accounted for 3,666 operations in 2014 and have averaged 3,562 since 2005. Aircraft in ADG IV accounted for 4,454 operations in 2014 and have averaged 4,642 since 2005. Both of these categories exceed the 500 annual operations threshold. Aircraft classified in ADG V and VI will occasionally operate at the Sunport, but total operations by these aircraft have not reached the FAA's critical aircraft threshold in the recent past.

The current design aircraft for the Sunport is D-V-6 as identified on the Airport Layout Plan and represented by a Boeing 747. It is recommended that the design aircraft be changed from D-V-6 (Boeing 747) to D-IV-5. Because there is not a single D-IV aircraft that meets the operational threshold, the design aircraft is a composite. Operations in approach category D such as the Boeing 737-800/900 and the MD-83/88 exceeds the 500 operations threshold and operations in ADG IV such as the Boeing 757, 767, and Airbus 300-600 also exceeds 500 annual operations threshold.

RUNWAY DESIGN AIRCRAFT

Each runway is assigned an RDC. The RDC relates to specific FAA design standards that should be met in relation to each runway.

Runway 8-26 is the primary runway and should be designed to accommodate the critical design aircraft. This runway is 13,793 feet long and has an instrument landing system providing visibility minimums as

COMMERCIAL TRANSPORT JET ITINERANT OPERATIONS BY CLASSIFICATION

ARC/ ADG	Aircraft Type	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
C-III	B-727	998	1,006	942	506	72	126	42	4	6	24
	B-737 (100, 200)	52	36	80	44	16	8	32	36	28	4
	B-737 (300)	29,986	26,252	25,722	18,610	13,182	16,238	15,326	12,374	9,582	7,756
	B-737 (400, 500, 600)	3,814	3,854	4,998	4,790	3,738	3,658	1,934	1,900	758	590
	B-737 (700)	13,786	15,888	19,216	26,534	25,088	18,680	20,520	20,790	19,892	19,206
	MD-81, 82, 87, 90	6,450	5,986	5,088	5,248	5,458	4,854	4,272	4,842	3,624	3,421
	A318, A319, A320, A321	4,620	5,976	5,642	7,218	7,516	4,278	2,652	2,124	3,522	1,284
	DC-9 (10,30.50)	1,258	6,480	1,142	1,168	470	416	256	132	76	90
TOTAL C-III		**60,964**	**65,478**	**62,830**	**64,118**	**55,540**	**48,258**	**45,034**	**42,202**	**37,488**	**32,375**
C-IV	B-707	18	22	10	14	10	6	2	-	-	-
	B-757 (200, 300)	2,936	1,392	1,452	1,388	1,084	950	1,154	940	900	1,142
	B-767 (200, 300)	440	398	290	320	740	690	734	772	1,074	1,496
	B-787 (800)	-	-	-	-	-	-	6	-	2	2
	A-300/310 (600)	2,510	2,596	2,866	3,164	2,626	2,544	2,392	2,218	1,968	1,600
TOTAL C-IV		**5,904**	**4,408**	**4,618**	**4,886**	**4,460**	**4,190**	**4,288**	**3,930**	**3,944**	**4,240**
C-V	B-777 (200)	-	-	2	-	-	2	-	-	-	-
	A-330 (200, 300)	-	-	-	-	-	2	2	-	2	2
TOTAL C-V		**0**	**0**	**2**	**0**	**0**	**4**	**2**	**0**	**2**	**2**
D-III	B-737 (800)	2,130	400	776	220	270	318	372	284	814	864
	B-737 (900)	8	6	4	10	8	6	8	22	16	24
	MD-83, 88	1,422	4,208	3,772	3,246	2,524	3,276	2,548	2,298	2,906	2,770
TOTAL D-III		**3,560**	**4,614**	**4,552**	**3,476**	**2,802**	**3,600**	**2,928**	**2,604**	**3,736**	**3,658**
D-IV	MD-11	-	-	-	-	8	150	134	12	8	12
	DC-10	34	22	20	16	4	24	144	286	296	202
TOTAL D-IV		**34**	**22**	**20**	**16**	**12**	**174**	**278**	**298**	**304**	**214**
D-V	B-747 (100, 200, 300, 400)	6	4	6	-	2	2	4	6	2	6
	B-777 (300)	2	-	-	-	4	-	-	-	-	-
	A-340/350/360 (200)	4	2	-	4	6	-	-	2	-	-
TOTAL D-V		**12**	**6**	**6**	**4**	**12**	**2**	**4**	**8**	**2**	**6**
D-VI	B-747 (8/F)	-	-	-	-	-	-	-	-	-	-
	B-767 (200ER, 300ER, 400)	2	2	-	-	-	-	-	-	-	-
	AN-124	-	8	4	-	-	2	6	6	-	2
TOTAL D-VI or larger		**2**	**10**	**4**	**0**	**0**	**2**	**6**	**6**	**0**	**2**
TOTAL ITINERANT JET OPERATIONS CAPTURED		**70,476**	**74,538**	**72,032**	**72,500**	**62,826**	**56,230**	**52,540**	**49,048**	**45,476**	**40,497**

TOTAL JET OPERATIONS BY CLASSIFICATION

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Aircraft Approach Category										
C	66,868	69,886	67,450	69,004	60,000	52,452	49,324	46,132	41,434	36,617
D	3,574	4,630	4,562	3,480	2,814	3,604	2,938	2,618	3,738	3,666
Airplane Design Group										
III	64,524	70,092	67,382	67,594	58,342	51,858	47,962	44,806	41,224	36,033
IV	5,938	4,430	4,638	4,902	4,472	4,364	4,566	4,228	4,248	4,454
V	12	6	8	4	12	6	6	8	4	8
VI	2	10	4	0	0	2	6	6	0	2

low as ½-mile (civilian) ⅜-mile (military) for instrument approaches to Runway 8. **Therefore, the applicable RDC is D-IV-1600**. The RDC is planned to remain the same into the future.

Runway 3-21 is the commercial crosswind runway measuring 10,000 feet long and 150 feet wide. This runway is heavily utilized by the commercial carriers when the winds dictate or as directed by the tower. The lowest visibility minimum is ½-mile to Runway 3. **The RDC for Runway 3-21 is D-IV-2400.** It is planned to remain the same into the future.

Runway 12-30 is the general aviation crosswind runway which is 6,000 feet long and 150 feet wide. This runway is most heavily used by general aviation aircraft as the winds dictate or as the tower instructs. **The RDC for Runway 12-30 is B-III-VIS.** Ultimately, a non-precision instrument approach with not lower than 1-mile visibility minimums is considered. Therefore, the future RDC for this runway is B-III-5000.

The AAC and ADG design components for each Runway RDC are anticipated to remain unchanged into the future. The RVR (visibility component) may change based on analysis and recommendations regarding potential instrument approach capability. **Table 2BB** summarizes the design aircraft components as applied currently to the airport and the runways.

TABLE 2BB
Design Aircraft
Albuquerque International Sunport

Airport Design Aircraft	Airport Reference Code (ARC)	Airport Design Aircraft	Representative Aircraft
	D-IV	D-IV-5	Airbus 300-600

Runway Design Parameters	Runway Design Code (RDC)	Approach Reference Code (APRC)	Departure Reference Code (DPRC)	Representative Aircraft
Runway 8-26 (500' rwy/twy separation)	D-IV-1600 (⅜-mile)	D-VI-2400 & D-V-1600	D-VI	A300-600
Runway 3-21 (450' rwy/twy separation)	D-IV-2400 (½-mile)	D-VI-2400 & D-V-2400	D-IV & D-V	B-767-300F
Runway 12-30 (340' rwy/twy separation)	B-III-VIS	B-III-VIS & D-II-5000 (1-mile)	B-III & D-II	ATR-72

Source: Current Airport Layout Plan; FAA AC 150/5300-13A, Airport Design

SUMMARY

This chapter has outlined the various activity levels that might reasonably be anticipated over the planning period as well as the critical design aircraft for the airport. Airline passenger enplanements are forecast to grow at an annual rate of 1.40 percent. Total operations are forecast to grow 0.76 percent annually. Based aircraft are forecast to grow from 165 currently to 220 by the long-term for an annual growth rate of 1.45 percent. Air cargo tons and operations are forecast to grow 0.59 percent and 0.61

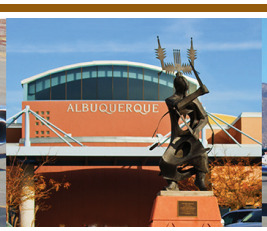
percent, respectively. As indicated earlier, the FAA approved these forecasts in May 2015. A copy of the approval letter is included in **Appendix C**.

The critical design aircraft for the Sunport is anticipated to remain in the D-IV airport reference code throughout the planning period. The runway design code for each runway is also planned to remain unchanged except for possible improvement to the visibility minimums for Runway 12-30.

The next step in the planning process is to assess the capabilities of the existing facilities to determine what upgrades may be necessary to meet future demands. The range of forecasts developed here will be taken forward in the next chapter as planning horizon activity levels that will serve as milestones or activity benchmarks in evaluating facility requirements. Peak activity characteristics will also be determined for the various activity levels for use in determining facility needs.

Chapter Three

SUSTAINABILITY BASELINE ASSESSMENT



Chapter Three

SUSTAINABILITY BASELINE ASSESSMENT

The Baseline Assessment provides an inventory and review of Albuquerque International Sunport's (ABQ or Sunport) current sustainability performance as determined by its related activities, policies, and procedures. This evaluation is an important first step in the development of the Sunport's long-term sustainability strategy that will support the economic vitality of the Sunport, ensure the efficient use of limited resources, reduce negative environmental impacts, and enhance the social well-being of the community. It will also enable the Sunport to measure, through existing and new metrics, its overall sustainability performance over time as well as the impact of individual initiatives.

SUSTAINABILITY AND THE SUNPORT

How an organization is structured and managed can have the most substantial impact on the success of sustainability integration. If there is no buy-in to sustainability practices at the highest levels of management, it is likely that the organization will not achieve its greatest potential. In November 2008, Jacobs Consultancy prepared a Sustainability Management System (SMS) intended to develop a management system for the City of Albuquerque Aviation Department that incorporates sustainability into daily business decisions. The stated goal of the Aviation Department in this document is to operate the "greenest" airport system (including both the Sunport and Double Eagle II Airport) in the country. It should be noted that this SMS document was prepared approximately two years prior to the

FAA's issuance of a memorandum that announced the Airport Sustainable Master Plan Pilot Program[1]. This indicates the progressive attitude of the Department and how it has been at the forefront of the airport sustainability movement.

An important first step to implementing a sustainability strategy into an organization is to adopt a sustainability mission or policy statement. Policy statements provide meaning to an organization's existence and summarize the aims and values of the organization. The Department has adopted the following sustainability policy statement:

> "The City of Albuquerque Aviation Department will be increasingly sustainable with regard to natural resource conservation, economic strength and community contributions.
>
> We will:
> - Establish and meet sustainability targets.
> - Continually improve our sustainability approach and results.
> - Make informed business decisions that incorporate sustainability factors."

Priorities have been established by the Department to increase its emphasis on sustainability efforts to protect the natural environment and resources of the City of Albuquerque. The sustainability priorities include:

- "The Department will achieve its transportation and economic mission in a manner that demonstrates responsible stewardship with a focus on water conservation, minimizing greenhouse gas emissions and innovation.
- As it implements proactive sustainable management and practices that continually improve the environment, the Department will contribute to the economic, social and environmental well-being of the City of Albuquerque and the region.
- The Department will fully comply with all applicable environmental laws, regulations and other requirements and will exceed legal and regulatory standards where appropriate.
- The Department will influence tenants to encourage active participation in the sustainability efforts."

The Department actively approaches environmental stewardship and sustainability using the following principles:

- "Establish Environmental Goals and Targets: using innovative technologies and best management practices, the Department will develop, monitor and regularly review specific activities and programs that improve environmental performance.
- Achieving Continual Environmental Improvement: The Department will strive to continually reduce the impacts of operations so that it preserves and protects surrounding natural resources through cost effective energy use, recycling, water conservation, waste reduction, pollution prevention activities and procurement of green materials.

[1] FAA Memorandum – *Airport Sustainability Master Plan Pilot Program*, Issued May 27, 2010.

- Using Sustainability in Business Decisions: The Department will seek to enhance the sustainability of its airports by incorporating sustainability into daily business decisions."

The SMS document does not prescribe how business decisions will address sustainability, but instead prescribes the methodology for making sure that sustainability is a factor in business decisions. The SMS document is included as **Appendix C** to this Master Plan.

TENANT SUSTAINABILITY QUESTIONNAIRE

As part of the Baseline Assessment, a questionnaire was distributed to Sunport tenants (e.g., airline/airline-support operators, concessionaires, fixed base operators, specialty operators, air cargo operators, and aircraft owners). The purpose of the questionnaire is to supplement the sustainability baseline effort with tenants' sustainability efforts and priorities for future sustainability development at the Sunport. The questionnaire also serves to engage the tenants in the Sunport's sustainability programs and raise awareness of the Sustainable Master Plan project.

The questionnaire was emailed to approximately 50 tenants and 12 responses were submitted for a response rate of 24 percent. The following bullets summarize the responses received:

- Respondent organizations/businesses employ a combined 557 full-time employees at the Sunport.

- Respondents were asked to rate their facilities in terms of condition. Of the 13 facilities rated, only one (an aircraft storage hangar) was rated as being in fair condition (moderate updates needed). All other facilities were rated as being in good (minor maintenance needed) or excellent (recently updated/no maintenance necessary) condition. No facilities were rated in poor (major renovation/updated needed) condition.

- Five respondents indicated that their organization/business had a formal sustainability program/policy.

- Existing sustainability initiatives that have been implemented by the respondent organizations/businesses include:
    - Paper recycling – 7 respondents
    - Plastics recycling – 6 respondents
    - Glass recycling – 1 respondent
    - Metals recycling – 3 respondents
    - Electronics recycling – 5 respondents
    - High-efficiency water fixtures – 2 respondents
    - High-efficiency (LED) lighting – 2 respondents
    - Local procurement policies – 3 respondents
    - Employee training programs – 5 respondents

  - On-site renewable energy generation (PV solar panels or other) – 1 respondent
  - Low-emission (hybrid/electric/CNG) fleet vehicle(s) – 1 respondent

- Most of the respondents indicated that their sustainability initiatives have been implemented within the last five years. Four respondents indicated their organization/business has conducted sustainability initiatives for more than six years. Two respondents do not currently participate in any sustainability initiatives.

- When asked how their organization/business monitors its sustainability practices, most indicated they have no monitoring program in place. Three respondents indicated they monitor their programs by reviewing monthly utility/waste removal invoices.

- Respondents indicated plans for their organization/business, including implementing recycling programs, high-efficiency water fixtures, local procurement policies, on-site renewable energy generation, and reducing material use.

- Respondents were asked to rank sustainability initiatives based upon their priority for implementation at the Sunport. The results are as follows (1 = highest priority 7 = lowest priority):
  - 1 – Waste Management & Recycling Initiatives
  - 2 – Energy Efficiency/On-site Generation Initiatives
  - 3 – Water Conservation & Water Quality Initiatives
  - 4 – Air Quality & Greenhouse Gas Emissions Reduction Initiatives
  - 5 – Natural Resource Management Initiatives
  - 6 – Surface Transportation Initiatives
  - 7 – Social and Community Oriented Initiatives

BASELINE ASSESSMENT CONTENTS

At the onset of the project, it was determined that the sustainability baseline assessment would focus on six categories. In accordance with FAA guidelines, three categories were predetermined during the project scoping process to involve detailed studies including:

- Waste management and recycling
- Energy
- Air quality and greenhouse gas (GHG) emissions

Three additional categories were selected based upon discussions with Aviation Department staff. The selected additional categories include:

- Water conservation and water quality
- Surface transportation
- Natural resource management

This baseline assessment will present current emission/consumption data and relevant information related to each category as well as an initial list of potential improvement opportunities. Listed opportunities in this chapter should be considered a starting point for discussions and are not final. A final list of recommendations and initiatives will be identified and evaluated later in the Sustainable Master Plan process after thorough consideration by the Aviation Department, Technical and Advisory Committees, tenants, and the public.

WASTE MANAGEMENT AND RECYCLING

BACKGROUND

New Mexicans spent $51 million dollars to bury $168 million worth of recycled materials.

According to a report funded by the U.S. Department of Energy and released by the New Mexico Recycling Coalition (NMRC) in 2010, New Mexicans buried $168 million worth of valuable material in landfills instead of recycling it. The average cost to dispose of solid waste was found to be $31.29 per ton. At this rate, it is estimated that New Mexicans spent $51 million dollars to bury that $168 million worth of recycled materials. These statistics highlight the potential benefits recycling offers in reducing disposal costs and potential revenue.

The City of Albuquerque offers numerous programs to promote city-wide recycling and beautification projects and maintains trash and recycling drop-off sites throughout the city. Other recycling benefits promoted by the city include preserving natural resources and protecting the air, soil, and groundwater. As an example, the production of an aluminum can from recycled metal uses 95 percent less energy than a can produced from raw aluminum.

Section 133 of the *FAA Modernization and Reform Act* established that airport master plans must address certain issues related to solid waste recycling at airports. The issues to be addressed include:

a) The feasibility of solid waste recycling at the airport;
b) Minimizing the generation of solid waste at the airport;
c) Operation and maintenance requirements;
d) A review of waste management contracts; and
e) The potential for cost savings or the generation of revenue.

The Environmental Protection Agency (EPA) has developed a multi-step program for establishing a successful airport recycling program:

- Obtain commitment from upper management;
- Organize a green team/recycling coordinator;
- Identify types and sources of waste;
- Asses current waste collection contracts;

- Develop a plan;
- Educate staff and customers;
- Monitor and refine the plan;
- Measure performance;
- Promote successes; and
- Expand the program.

Management support is crucial to developing and sustaining the recycling program since management must authorize team members' time commitment, responsibilities, and financial investment. The Aviation Department has adopted and published a Recycling Program manual, updated in May 2009, to assist and educate Sunport employees in ways to help reduce waste and increase the amount of recyclable waste diverted from landfills. The Recycling Program includes a description of the material that can be recycled (paper, plastics, and aluminum) as well as a discussion with energy and cost savings on why diverting recyclable material from the landfill is a wise choice.

As part of this Sustainable Master Plan, a waste assessment for the Sunport will be conducted to provide qualitative and quantitative data and a baseline to measure progress in future years. Specifically, it will help answer the following questions:

- What areas on the airport generate waste;
- What recyclable material is generated;
- What type of waste is generated in each area;
- How much waste is generated; and
- What are the costs for trash and recycling containers, hauling, and disposal.

The waste assessment is scheduled for late summer 2015, and its findings will be incorporated into this Sustainable Master Plan.

SOLID WASTE

The Aviation Department implemented a recycling program at the Sunport in 2007. The Aviation Department collections are deposited in waste bins located north of the A Concourse. Pick up of the Aviation Department recycle collection bins (two bins) occurs three times per week. A special pick up, typically once per quarter, collects cardboard material from Southwest Airlines (SWA). SWA also has a recycling program that collects recyclable material from aircraft at the gates and deposits it in waste bins near the SWA provisioning building. The SWA recycle bins are picked up separately from the Aviation Department bins two

times per month. The recycle collection bins located at the SWA Provisioning are provided by the Aviation Department.

The Sunport generates approximately 2.9 tons of mixed solid waste per day.

The other signatory airlines and terminal tenants at the Sunport do not have recycling programs operating with separate collection bins at the Sunport. They are allowed to use the Aviation Department's recycle collection bins located north of the A Concourse. There is no documentation or separate data collection for recyclables collected by the other airlines or tenants. The Aviation Department has reached out to each of the airlines advising them that the city's bins are available for their use; however, the only use appears to be for the removal of solid waste from aircraft. Several airlines have inquired whether the Aviation Department would provide janitorial trash service with recyclable material sorting in the airlines' office and operations areas. Due to security concerns, probable cost, and labor expenses that would occur, those requests have not been granted.

The Sunport generates approximately 2.9 tons of mixed solid waste per day including trash and recyclable materials, not including green waste. In 2007, at the onset of the program, data collected by the City of Albuquerque and SWA indicated that approximately 5.32 tons of paper, plastics, and aluminum were collected and recycled per month. The most recent data indicates that the Sunport collected an average of approximately 5.7 tons per month of recyclable waste in the program (for the period January through May 2015, as reported by the City of Albuquerque Solid Waste Department from scaled weights).

Data between November 2011 and January 2015 did not include the recyclable waste picked up from the Aviation Department's bin. At that time, the city was constructing a new recycling sort facility and the data was not available. During that period, the SWA Provisioning bins were collected by private contractors, either Waste Management, Inc or MCT Industries, and scaled weights provided by the contractors. In January 2015, the City of Albuquerque has started providing and hauling the bins located at the SWA Provisioning Bldg. and is providing the weight data to the Aviation Department from weigh scales. A summary of solid waste and recycled waste data from 2007 to 2015 (January through May) is provided in **Table 3A**.

TABLE 3A
Solid Waste and Recycling Data (Aviation Department and SWA Bins)
Albuquerque International Sunport

	2007	2008	2009	2010	2011	2012[a]	2013[a]	2014[a]	2015[b]
Total Mixed Solid Waste (tons)	1,730	1,572	1,447	1,385	1,376	1,268	1,110	1,047	28.85
Total Recycled Waste/year (tons)	47.90	59.01	57.12	49.87	49.35	26.8	22.36	17.45	N/A
Monthly Average Recycled Waste (tons)	5.32	4.92	4.76	4.16	4.11	2.23	1.86	1.45	5.77
Average Recycled Waste per Enplaned Passenger (lbs./passenger/year	0.029	0.036	0.039	0.034	0.034	0.020	0.018	0.014	0.086

[a] Data includes measured tonnage only for SWA Provisioning bins obtained from Waste Management or MCT Industries. City of Albuquerque collections were not measured from December 2011 to December 2014. City of Albuquerque collections began again in January 2015 and include the SWA Provisioning bins.
[b] Data available for January through May 2015.
N/A – Not Available
Source: City of Albuquerque Aviation Department

The Aviation Department encourages the traveling public to participate in the recycling program by providing 16 stainless steel recycling containers co-located with trash receptacles within the terminal including at the bag claims, along the ticketing level and along the concourse level near the gates. Recycle receptacles have also been placed in all Aviation Department employee break rooms, near copying machines and at various points in the administrative offices to encourage the employees to participate in the program. The custodial staff has been trained to separate the refuse from the recycle receptacles from the trash receptacles and to place in the appropriate bins for pick up.

GREEN WASTE

The Sunport has large landscaped areas, and green waste is generated throughout the year including grass clippings, tree trimmings and dropped leaves. Data was collected by the City of Albuquerque Parks and Recreation Department from 2008 through 2013 for green waste collected from the Sunport landscape maintenance operation. The data indicates that approximately 260 cubic yards per year of green waste was delivered to the Parks and Recreation Department for composting. The Aviation Department hired a private firm for the Sunport campus landscape maintenance operation in 2014 replacing the City Parks and Recreation crews, and subsequently, data has not been collected on the green waste produced at the Sunport since that change.

Beginning in the spring of 2015, the Aviation Department started an on-site composting operation for green waste collected from the Sunport landscaping. The volume of the green waste delivered to the composting operation has not been measured or recorded to date; however, it is anticipated that the first compost produced at the Aviation Department's on-site facility will be ready for use on the Sunport landscape in the fall of 2015. The Aviation Department anticipates that all the composted material produced by the green waste composting operation will be used on the Sunport's landscaping.

POTENTIAL OPPORTUNITIES FOR PERFORMANCE IMPROVEMENT

The Aviation Department has opportunities to enhance recycling at the Sunport including, but not necessarily limited to, the following:

- Expand recycling marketing and promotion efforts within the terminal.
- Engage tenants and airlines to ensure their involvement in the recycling program.
- Incorporate recycling initiatives into tenant contracts.
- Collaborate with the city's Solid Waste Management Department on expanding the Sunport's recycling program.
- Explore composting opportunities for food waste from on-site restaurants.
- Conduct regular (annual/semi-annual) waste assessments to monitor solid waste and recycling rates.
- Periodic P.A. announcements about recycling and other programs.
- Learn about recycling and other programs at green kiosks throughout terminal.

ENERGY

BACKGROUND

The State of New Mexico has been a leader in the advancement of solar energy projects. According to a study[2] prepared for the Environment New Mexico Research & Policy Center[3], the state has the potential to produce more than 1,000 times as much electricity from solar photovoltaic (PV) and concentrating solar power (CSP) installations as the state consumes each year.

The state has the potential to produce more than 1,000 times as much electricity from solar photovoltaic (PV) and concentrating solar power (CSP) installations as the state consumes each year.

The City of Albuquerque has made major strides towards clean/renewable energy. Numerous city programs are available to promote and support efforts to make energy efficient upgrades and to install

[2] *Star Power - The Growing Role of Solar Energy In New Mexico* - http://www.environmentnewmexico.org/sites/environment/files/reports/NM_Star_Power.pdf

[3] For more information: http://www.environmentnewmexicocenter.org/

renewable energy generating systems. The Aviation Department has contributed towards these efforts by installing on-site PV and CSP systems. All airfield lighting at the Sunport has been upgraded to more efficient light-emitting diode (LED) bulbs that are expected to provide a 70 percent energy reduction from conventional technologies. Additional energy conservation efforts undertaken by the Aviation Department include replacing lights in the airfield maintenance facility to low-energy T8 lamps, replacement of exit signs with LED fixtures, and installing motion detecting timer switches in break rooms, the men's restroom and the Airfield Manager's office.

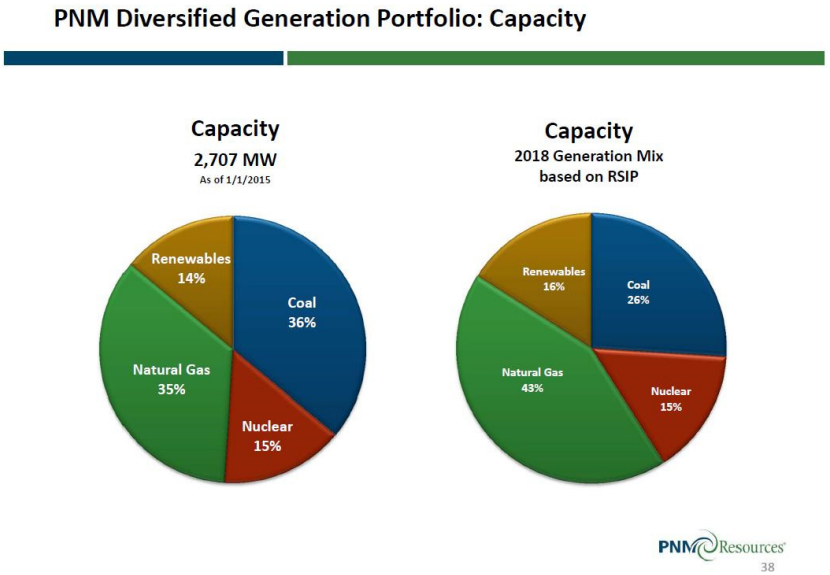
Even with these energy conservation efforts, the majority of the energy consumed at the Sunport (electric and gas utilities) is purchased from energy service providers. This section provides a summary of the electric, natural gas, renewable energy generation currently on the site.

ELECTRIC UTILITY DATA

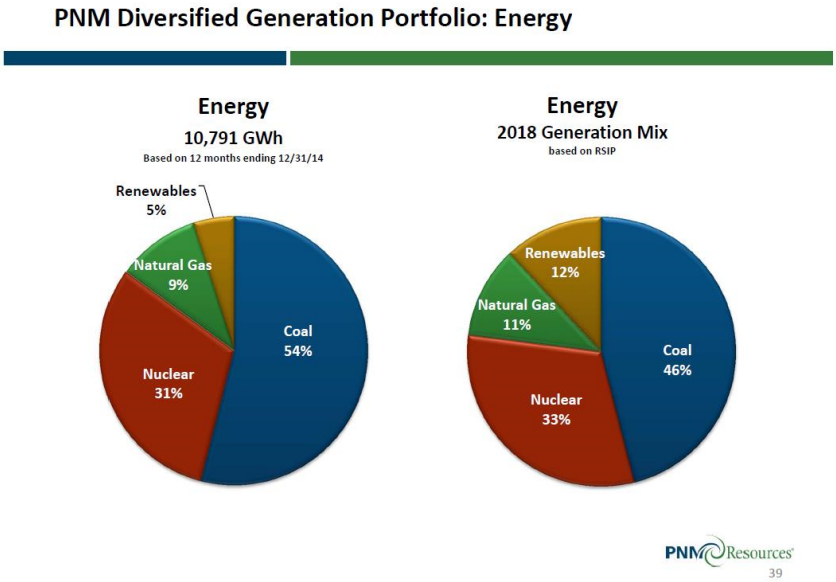
Electricity is provided to the Sunport by Public Service Company of New Mexico (PNM), which relies on a diverse portfolio of energy sources as outlined in the chart below.

Name	Location	Year Fully Completed	Fuel	Capacity (MW)	PNM's Share of Capacity	Operator
San Juan Generating Station	Waterflow, NM	1982	Coal	1,646	783	PNM
Four Corner Power Plant	Navajo Nation	1970	Coal	1,478	200	Arizona Public Service Co.
Palo Verde Nuclear Generating Station	Near Phoenix, AZ	1986	Nuclear	2,628	268	Arizona Public Service Co.
Reeves Generating Station	Albuquerque, NM	1962	Natural Gas	154	154	PNM
Afton Generating Station	Near Las Cruces, NM	2007	Natural Gas	230	230	PNM
Luna Energy Facility	Near Deming, NM	2006	Natural Gas	570	185	PNM
Lordsburg Generating Station	Lordsburg, NM	2007	Natural Gas	80	80	PNM
New Mexico Wind Energy Center	Near House, NM	2003	Wind	200	200	Third-party owner/operator
Valencia Energy Facility	Near Belen, NM	2008	Natural Gas	145	145	Third-party owner/operator
Delta-Person Generating Station	Albuquerque, NM	2001	Natural Gas	132	132	Third-party owner/operator
Demand-response programs (PNM Power Saver/PNM Peak Saver	n/a	n/a	n/a	57	57	
PNM Solar Energy Facilities	Various locations throughout NM	2011	Solar Photovoltaic	22.5	22.5	PNM
Customer Solar Program (Distributed Solar PV Facilities)	PNM Customer sites (most often rooftop panel arrays)	n/a	Solar PV	22	22	Various (customer-owned generation)

PNM's energy capacity, as of January 1, 2015, consists primarily of coal and natural gas, which represents 71 percent of their capacity. Remaining capacity is made up of nuclear (15 percent) and renewables (14 percent). By 2018, PNM projects their renewable capacity to grow by two percent and natural gas to grow by eight percent. Nuclear capacity is projected to remain static, and coal capacity is projected to decline by ten percent.



In terms of energy production as of the end of 2014, PNM produces 54 percent of its energy from coal, 31 percent from nuclear, nine percent from natural gas, and only five percent from renewables. By 2018, PNM projects renewable energy production to increase by seven percent, natural gas to grow by two percent, nuclear to grow by two percent, and coal to decrease by eight percent.



According to Aviation Department records, electric meters are located at 18 different locations at the Sunport. **Table 3B** provides total electrical kilowatt-hours (kWh) consumption for the period 2012 through 2014. Records show annual electric consumption on these meters has decreased from 17.1 million kWh in 2012 to 14.9 million kWh in 2014, a 13.4 percent reduction. The decrease is likely due, in part, to the reduction in the number of flights due to the expiration of the Wright Amendment as well as implementation of energy efficiency measures in Sunport facilities.

TABLE 3B
Electric Usage (kWh)
Albuquerque International Sunport

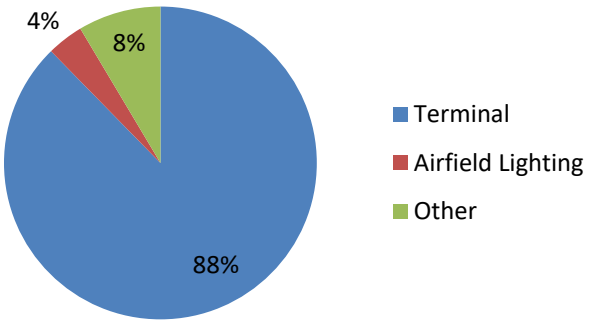
Meter Address	2012	2013	2014	2 Year % Change
Terminal Meters				
2200 Sunport Blvd SE	2,471,173	2,277,298	2,144,338	-13.2%
2200 Sunport Power Center 1 SE	88,017	89,824	86,251	-2.0%
2200 Sunport Power Center 2 SE	4,072,228	3,865,372	3,238,094	-20.5%
2200 Sunport Power Center 3 SE	1,991,800	2,093,520	1,975,400	-0.8%
2200 Sunport Power Center 4 SE	2,407,400	2,337,600	2,168,400	-9.9%
2200 Sunport Power Center 5 SE	3,081,964	2,923,928	2,756,748	-10.6%
2200 Sunport Power Center 6 SE	998,000	907,000	656,000	-34.3%
Terminal Subtotal	**15,110,582**	**14,494,542**	**13,025,231**	**-13.8%**
Non-Terminal Meters				
Sunport Airfield Lighting	588,216	583,436	559,478	-4.9%
1820 Randolph Rd SE – Aviation Dept.	102,160	-	-	-100.0%
2220 Kirtland Dr SE – Freight Bldg.	216,940	234,293	224,663	3.6%
2400 Sunport SE – Parking Admin.	148,501	155,867	145,205	-2.2%
2440 Clark Carr Loop SE – Skyrunners Hangar	13,611	10,274	6,267	-54.0%
2460 Clark Carr Loop SE – Six T-Hangar	1,789	1,330	1,309	-26.8%
2500 George SE – Aviation Dept.	23,008	28,258	26,105	13.5%
2615 Clark Carr Loop SE – Aviation Dept.	31,440	31,080	30,240	-3.8%
2700 Yale Blvd SE – Aviation Dept.	180	180	180	0.0%
2801 Girard Blvd SE – Aviation Dept.	18,331	16,430	27,824	51.8%
2920 Yale Blvd SE – Aviation Dept.	312,960	262,480	252,320	-19.4%
3113 Yale Blvd SE – SW Airlines	50,365	43,839	54,221	7.7%
3302 Yale SE – Aviation Dept.	3,616	3,818	3,480	-3.8%
3601 Access Road C SE – Aviation Dept.	161,119	140,229	139,448	-13.5%
3621 Access Road C SE – Aviation Dept.	31,676	28,307	29,068	-8.2%
3720 Access Road D SE – Aviation Dept.	39,980	35,550	32,863	-17.8%
3720 Spirit Dr SE – Aviation Dept.	290,917	306,075	297,169	2.1%
Non-Terminal Meters Subtotal	**2,034,809**	**1,881,446**	**1,829,840**	**-10.1%**
Total Sunport Electricity Usage	**17,145,391**	**16,375,988**	**14,855,071**	**-13.5%**

Source: Aviation Department

The pie chart on the following page summarizes electrical consumption by facility. The Sunport passenger terminal building is by far the largest consumer of electricity, accounting for 88 percent of consumption. Other facilities on the Sunport (all other meters excluding the terminal and airfield lighting) accounted for eight percent of consumption, and airfield lighting accounted for the remaining four percent of consumption.

The Sunport passenger terminal building is by far the largest consumer of electricity, accounting for 88 percent of consumption.

Electrical Consumption (kWh)
by Use
Albuquerque International Sunport



NATURAL GAS

In total, there are 20 individual gas meters on the Sunport managed by the Aviation Department. **Table 3C** provides total natural gas consumption in therms (One (1) therm is equal to 100,000 British thermal units [Btu's] or 100 cubic feet of natural gas) from 2012 through 2014. Most of the meter identifications are somewhat vague and lack location information. This data will be further explored to provide more detailed descriptions of the meters.

TABLE 3C
Natural Gas Usage (therms)
Albuquerque International Sunport

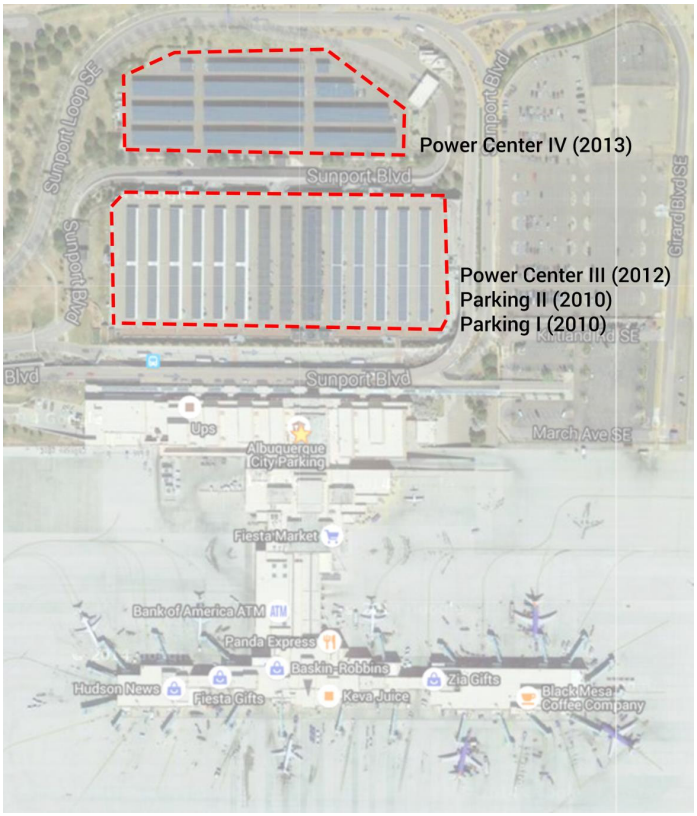
Meter ID	2012	2013	2014	2 Year % Change
Terminal Building	256,500	286,790	235,040	-8.4%
Rental Car Center	19,980	27,070	20,750	3.9%
Aviation Airport 1	17,020	16,450	17,700	4.0%
Aviation	14,010	16,170	13,690	-2.3%
Aviation Airport 2	5,490	3,920	3,920	-28.6%
Aviation Airport 3	3,000	3,460	3,000	0.0%
AFSS Building Aviation	890	1,730	2,420	171.9%
Aviation Airport 5	1,660	2,180	2,180	31.3%
Misc. Gas 18	1,700	1,700	1,460	-14.1%
Aviation Freight Bldg.	1,310	1,540	1,450	10.7%
Aviation Airport 4	590	800	1,310	122.0%
Aviation Airport 6	-	90	1,310	--
Misc. Gas 15	1,090	1,010	1,100	0.9%
ABQ Aviation	840	520	940	11.9%
Aviation Flame of Hope	880	880	920	4.5%
Aviation 1	1,860	200	470	-74.7%
Aviation Admin	210	220	180	-14.3%
Aviation 2	-	10	10	--
Aviation Parking	30	-	-	-100.0%
Total Natural Gas Usage	**327,060**	**364,740**	**307,850**	**-5.9%**

Source: Aviation Department

The data indicates that the terminal building is by far the largest consumer of natural gas, accounting for approximately 76 percent of total Sunport usage. The next largest user is the rental car center at seven percent of total usage. Since 2012, the terminal has reduced its natural gas consumption by 8.4 percent, again likely due to efficiency upgrades. Overall, total Sunport natural gas consumption has declined by 5.9 percent since 2012.

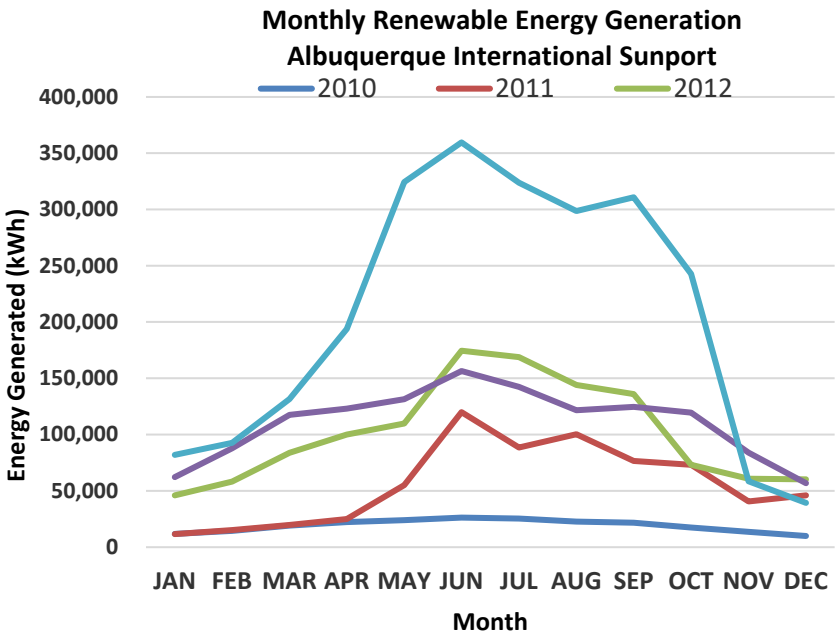
RENEWABLE ENERGY

The Sunport's existing PV systems, identified in the adjacent map, were installed over the period from 2010 to 2013. The original PV system (Parking I & Parking II) had a capacity of 146 kilowatts (kW) and consisted of 480 panels covering the eight western-most canopies of the Sunport's terminal parking structure. The PV expansion in 2012 (Power Center III), funded by the FAA's Voluntary Airport Low Emissions (VALE) grant, added 440 kW of capacity with 2,016 new panels. In 2013, another VALE grant allowed the Aviation Department to add 411 kW of capacity to the parking structure PV system (Power Center IV). The electricity generated by this system powers the parking structure with excess power used in the terminal building. In the 2014 calendar year, the PV systems produced approximately 2.5 million kWh of electricity. This represents approximately 16 percent of the overall electric usage for Aviation Department operated facilities.

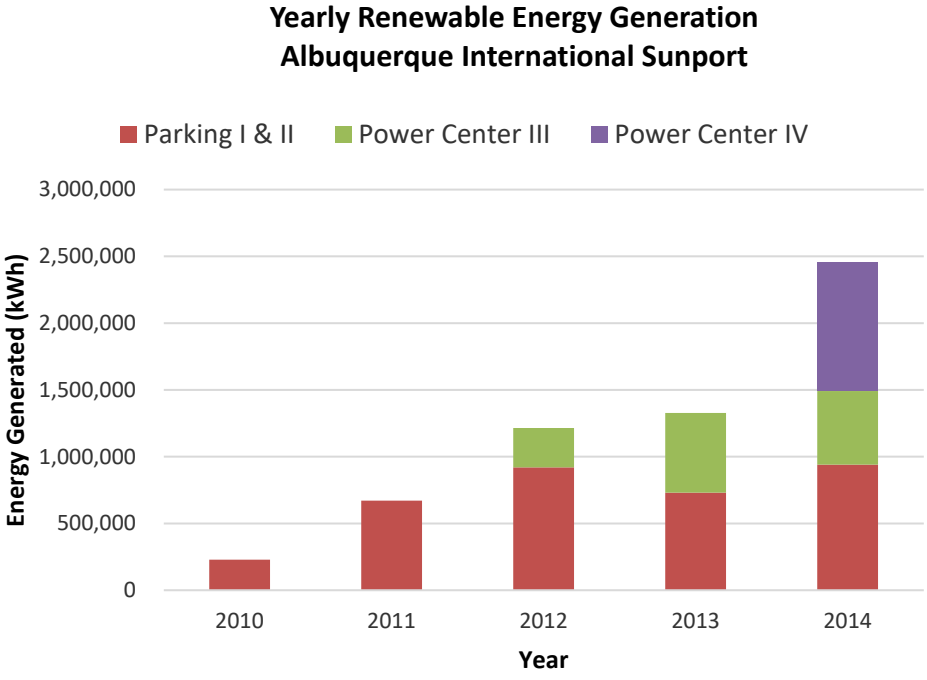


In 2008, the Landside Operations Division (parking) acquired a Miles EV to assist staff with their everyday vehicle needs. On a full charge, the EV can be driven up to eight hours at a maximum speed of 25 mph. In 2011, the Sunport also installed a 24-panel 20kW ground-mounted concentrator photovoltaic (CPV) tracking system to provide electricity primarily to recharge the EV, making it a zero emissions vehicle. When the CPV system generates excess electricity, it is used to reduce energy costs and consumption for the parking office.

The following graphs depict the output from the solar systems from 2010 through 2014 on a monthly and yearly basis. The total output is as high as 350,000 kWh in the summer months of fiscal year 2014.



Over this period (2010 – 2014), the renewable energy systems have generated almost 5.9 million kWhs of electricity and the Aviation Department has saved approximately $573,585 in energy expenses.



In addition to the solar PV system on the parking structure, a tracking solar hot water system is installed at the rental car center. This system was designed to produce hot water, which served an absorption chiller to provide cooling to the facility. Unfortunately, due to maintenance and reliability issues, this

system is no longer operating. The next phase of the study will investigate the potential of converting this system to either a direct heating system (winter) or adding PV capacity and converting it to a tracking solar electric photovoltaic system.

The Aviation Department's maintenance technicians have received training from the Photovoltaic Academy offered by Central New Mexico Community College (CNM) Workforce Training Center. This training allows the technicians to obtain a North American Board of Certified Energy Practitioners (NABCEP) license.

POTENTIAL OPPORTUNITIES FOR PERFORMANCE IMPROVEMENT

The baseline utility assessment indicates where there may be opportunities for improvement in all the buildings. The terminal building reflects much of the energy consumption in terms of both electric and natural gas and, therefore, the greatest potential for energy savings. To this end, a detailed energy model has been developed for the facility. This model is calibrated and used as the basis for calculating energy savings opportunities in the next phase of the study. The results of the energy model are presented in Volume 3, Section 3 of this master plan.

AIR QUALITY AND GREENHOUSE GAS (GHG) EMISSIONS

BACKGROUND

GHGs include those gases, generated through human activities and natural processes, which absorb infrared radiation in the earth's atmosphere. Accumulation of GHGs increases the amount of energy held in the atmosphere, which has been linked to changes in the earth's climate. Consistent with Executive Order 13514 *Federal Leadership in Environmental, Energy, and Economic Performance*, GHGs for the purposes of this discussion include:

- Carbon dioxide (CO_2);
- Methane (CH_4);
- Nitrous oxide (N_2O);
- Sulfur hexafluoride (SF_6);
- Hydrofluorocarbons (HFC); and
- Perfluorocarbons (PFC).

Regarding airport activities, the primary source of GHGs is from the combustion of fuels, which primarily generates CO_2. Relatively small amounts of CH_4 and N_2O are also generated during combustion. These emissions result from the operation of aircraft, vehicles used for transporting passengers to and from airports, ground support equipment, airport maintenance and operations vehicles, and through use of utilities such as natural gas and electricity. Fluorinated compounds (SF_6, HFC, PFC) are typically generated through industrial activities and are considered less significant within the realm of aviation.

On both the global and national scale, the aviation sector is a relatively small contributor of GHGs. The International Civil Aviation Organization (ICAO) estimates that aviation accounts for two percent of total

global CO_2 emissions.[4] In comparison, within the United States, the General Accounting Office reports that, based on available U.S. Environmental Protection Agency (EPA) data, domestic aviation contributes approximately three percent of total carbon dioxide emissions, and the remainder of the transportation sector contributes approximately 20 percent of carbon dioxide emissions.

As stated in the FAA's Interim Guidance for *Considering Greenhouse Gases and Climate Under the National Environmental Policy Act (NEPA)*, FAA seeks to clarify the role that commercial aviation plays in GHG emissions and climate by participating in multiple research initiatives. In conjunction with other participating federal agencies (e.g., NASA, NOAA, EPA, and DOE), the FAA has worked with the U.S. Global Change Research Program to develop the Aviation Climate Change Research Initiative (ACCRI) to advance scientific understanding of regional and global climate impacts of aircraft emissions. FAA also funds the Partnership for Air Transportation Noise & Emissions Reduction (PARTNER) Center of Excellence research initiative to quantify the effects of aircraft exhaust and contrails on global and U.S. climate and atmospheric composition. The ICAO is examining similar research topics at the international level.

Commercial service airports, such as the Sunport, connect to the local and national transportation systems and have many stakeholders (e.g., passengers, users, tenants, and staff) to consider when evaluating GHG emissions. To maintain a consistent evaluation of GHG emissions, the World Resources Institute and the EPA recommend consideration of the organizational and operational boundaries to establish the context for GHG inventories. The organizational structure is generally determined by ownership and, by extension, any associated legal agreements. For the purposes of this baseline report, the organizational boundary includes the City of Albuquerque Department of Aviation and any tenants or leaseholders that have entered into a legal agreement with the Department of Aviation.

As outlined in the Airport Cooperative Research Program's *Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories (Guidebook)*, emissions associated with operations are designated within three categories to establish the operational boundaries for the inventory. The three categories include direct emissions (Scope 1), indirect emissions (Scope 2), and indirect and optional emissions (Scope 3). Each of the Scopes is further defined in the *Guidebook* as follows:

- Scope 1: Direct emissions are from sources that are owned and controlled by the reporting entity (e.g., on-airport emissions from combustion in owned and controlled boilers, furnaces, vehicles, etc.). For an airport, the Scope 1 emissions would be those associated with fuel-powered vehicles owned and operated by the Aviation Department, as well as stationary sources owned and operated by that entity. For instance, the Aviation Department owns maintenance equipment and ground vehicles that burn fuel to service the Sunport, as well as the terminal heating system or generators that may burn heating oil.

- Scope 2: Indirect emissions are those from the generation of purchased electricity consumed by the entity. This would represent the electricity acquired to power airport facilities. Tenant-purchased electricity would not be Scope 2, but Scope 3.

[4] International Civil Aviation Organization Environmental Report 2013, http://cfapp.icao.int/Environmental-Report-2013/files/assets/common/downloads/ICAO_2013_Environmental_Report.pdf

- Scope 3: Indirect and optional emissions are a consequence of the activities of the entity but occur at sources owned and controlled by another party. Scope 3 would be the largest quantity of emissions at an airport, because they would include aircraft-related emissions, emissions from all tenant-related activities (including aircraft operations and the associated ground support activities), as well as the public's ground travel to and from the Sunport.

CURRENT PERFORMANCE/BASELINE INFORMATION

The purpose of a GHG emissions inventory is to quantify GHG emissions emitted into the atmosphere from the sources within the organizational and operational boundaries described above. This information can be used to achieve several tasks:

- Identify the sources and activities within the Aviation Department's jurisdiction responsible for GHG emissions;
- Establish a basis for developing a GHG reduction plan; and
- Establish a basis to track GHG emissions.

Methodology

The GHG emissions inventory uses the Airport Carbon and Emissions Reporting Tool Version 3.0 (ACERT) developed by the Airports Council International (ACI). ACERT inputs include the following information and relevant emissions factors to quantify GHGs:

- Total aircraft, passenger, and cargo operations;
- Fuel use by airport and tenant vehicles;
- Electricity purchased by the airport operator and tenants;
- Aircraft taxi and APU usage times and engine run-ups;
- Glycol (deicing fluid) use; and
- Landside traffic estimates of passenger and staff ground access.

Based on the inputs above, ACERT outputs GHG emissions totals categorized by the previously discussed GHG protocol Scopes (direct, indirect, and indirect and optional). For the purposes of this analysis, the most recent information available was used, as discussed below. Information was collected through interviews with Aviation Department staff and tenants.

Aircraft Operations

Table 3D summarizes the annualized operational fleet mix for the Sunport. These totals are based on the consolidated flight schedule for commercial operations and a review of FAA's Air Traffic Activity System (ATADS) for general aviation operations. ACERT includes emissions factors that comprise all phases

of operation (run up, taxi, takeoff and landing) for 136 fixed wing and helicopter aircraft. Of the available aircraft, 127 are current aircraft in the U.S. fleet such as the Boeing 737, Learjet 45, and Cessna 182. For cases when an aircraft is not available in ACERT, ACI recommends selecting a comparable aircraft.

Additionally, nine generic aircraft (examples include one engine helicopter or two-engine piston) are available to the user. The number of operations (one takeoff or one landing) is multiplied by the corresponding emission factor to calculate the GHG emissions associated with aircraft operations. A limitation of the ACERT model is the absence of emissions factors for military aircraft which operate at the Sunport such as C-17 Globemaster, F-15 Eagle, and F-18 Hornet. As noted in **Table 3D**, 7,943 of the 130,069 operations were performed with aircraft for which there is no suitable substitute within ACERT. Based on ACERT guidance, the total operations input should be within 10 percent of the stated operations total. The modeling assumptions presented in **Table 3D** are compliant with this guidance and are considered to adequately represent aircraft emissions for the purposes of this inventory.

TABLE 3D
Baseline Operational Fleet Mix
Albuquerque International Sunport

Aircraft	Number of Operations
Airbus 300	1,518
Airbus 310	18
Airbus 319	132
Airbus 320	1,076
Airbus 321	18
Beech 1900D	113
Beech Super King 200B	746
Boeing 717	2
Boeing 737 (300-500)	27,258
Boeing 737 (600-900)	828
Boeing 757	1,094
Boeing 767-300	1,492
C-130 Hercules	6,211
Cessna 208B	10,447
Cessna 402	2,646
Cessna 525	2,269
Cessna 560XL	421
Cessna 680	200
Cessna 750	163
CL604	5,965
CRJ200	3,680
CRJ700	3,586
CRJ900	4,924
Dash 8-400	1,688
DHC-6 Twin Otter	278
Eclipse 500	1,837
EMB 135/145	2,926
EMB 170	1,096
Falcon 50	4
Fokker F100	141
Gulfstream V	135
Learjet 45	3,877
Learjet 60	169
MD11	204
MD83 (80-87)	4,952
MD95	1,254
Piper PA31 Cheyenne	3,052
Subtotal	**69,883**
Generic Aircraft	
1-eng piston aircraft	5,281
1-engine helicopter	26
2 turboprop aircraft	10,086
2-eng piston aircraft	9,522
2-engine helicopter	791
No Suitable Substitute	7,943
Subtotal	**52,243**

Source: Consolidated flight schedule; FAA Air Traffic Activity System (Calendar Year 2014); Coffman Associates analysis

Non-Aviation Fuel Use

Non-aviation fuel use includes fuels, such as gasoline and diesel, available for vehicles that are primarily used on the Sunport, such as those used for airport maintenance and airline service.

This fuel is not available for commercial sale and does not include fuel purchased for vehicle trips to or from the Sunport. **Table 3E** summarizes the non-aviation fuel use assumptions.

TABLE 3E
Non-Aviation Fuel Source
Albuquerque International Sunport

	Aviation Department	Tenant	Total
Gasoline (liters)	22,113	149,379	171,492
Diesel (liters)	62,741	624,390	687,131
Natural Gas (GJ)	567,481	149,422	716,903

Source: Aviation Department records

Electricity

Electricity purchased by the Aviation Department for airport use includes the administrative and common portions of the terminal, airside and landside lighting, maintenance areas, and support facilities. Total electricity consumption in 2014 totaled 14,855,071 kWhs. Additional information pertaining to electricity purchased by tenants was not available for this analysis.

Although not included within the ACERT modeling, it should be noted that ABQ owns and operates a photovoltaic array, which was constructed with FAA grant money through the Voluntary Airport Low Emissions (VALE) Program. The panels, which were installed on the roofs of the long-term parking shade structures, generate approximately one megawatt during peak periods. Based on airport records, the system produced 2.5 million kWh during 2014.

Deicing Fluid Use

Propylene glycol, commonly referred to as glycol or deicing fluid, is a liquid that is combined with water and applied during winter months at airports to remove ice or snow from aircraft or airport pavement surfaces to enhance operational safety. ACERT includes an emissions factor for GHG emitted through the deicing process. This is calculated in accordance with the quantity of glycol dispensed at the Sunport during a year. Based on information available from the Sunport's 2013 Stormwater Pollution Prevention Plan, up to 50,000 gallons of propylene glycol is used for deicing aircraft annually.

Landside Traffic Estimates

Within ACERT, landside traffic estimates are based on the number of Sunport and tenant employees and the estimated number of deliveries per day to each tenant. Based on the Sunport's organizational chart, the number of airport employees used for this analysis is 280, which includes 272 full time employees and eight part time employees. Based on a report titled *Economic Impacts of Albuquerque Airport System on the New Mexico Economy*, a total of 2,373 workers were employed by Sunport tenants such as commercial and cargo airlines, airfield-based companies, tenants, and federal and state employees. ACERT accepts input expressed as visits per tenant per day. The number of visits to each tenant was assumed to be ten per day.

Baseline GHG Emissions Inventory by Scope and Source

The greatest source of emissions results from operation of aircraft and APUs, which accounts for approximately 84 percent of overall GHG emissions.

Based on federal GHG protocols, GHG emissions are expressed as metric tons of carbon dioxide equivalent (MT CO_{2e}). As previously discussed, combustion is the primary GHG producing activity at airports, and CO_2 is the GHG emitted in the largest portion from combustion. Therefore, protocol states that the remaining combustion related GHG be converted to MT CO_{2e}, which is accomplished within ACERT. Based on the assumptions and methodology discussed above, a baseline GHG emissions inventory for the Sunport was prepared.

Using the previously defined Scopes, **Table 3F** summarizes the distribution of direct (Scope 1), indirect (Scope 2), and indirect and optional (Scope 3) GHG emissions. As indicated in the table, Scope 3 sources account for the largest percentage of emissions, followed by Scope 2 and Scope 1. The greatest source of emissions results from operation of aircraft and APUs, which accounts for approximately 84 percent of overall GHG emissions. This is followed by Sunport electricity use at nine percent. The next largest sources are tenant airside vehicles, natural gas consumption, and tenant staff and visitor vehicles each at approximately two percent.

TABLE 3F
Greenhouse Gas Inventory Summary
Albuquerque International Sunport

Entity	Source	Scope	CO_2	CH_4	N_2O	CO_{2e}	CO_{2e} %
Aviation Department	Airside Vehicles	1	218	0.0176	0.0136	222	0.21%
Aviation Department	Buildings (gas/oil/coal)	1	1,822	0.0325	0.0032	1,823	1.72%
Subtotal	**Airport Scope 1**		**2,039**	**0.0501**	**0.0168**	**2,046**	**1.93%**
Aviation Department	Electricity purchased	2	9,775	0.0	0.0	9,775	9.22%
Subtotal	**Airport Scope 2**		**9,775**	**0.0**	**0.0**	**9,775**	**9.22%**
Aviation Department Subtotal						**11,820**	**11.15%**
Tenant	Aircraft (LTO)	3	87,001	2.9438	0.0	87,062	82.16%
Tenant	Aircraft APU	3	2,430	0.0764	0.0	2,432	2.29%
Tenant	Aircraft De-icing	3	164	0.0	0.0	164	0.16%
Tenant	Airside Vehicles	3	2,005	0.1381	0.1370	2,050	1.93%
Tenant	Staff/visitor Vehicles	3	1,856	0.3700	0.1589	1,913	1.80%
Aviation Department	Employee Vehicles	3	209	0.0425	0.0179	216	0.20%
Tenant/off-site/Staff Subtotal						**93,837**	**88.55%**
Ground Access	Cars, taxi	3	37	0.01	0.00	38	0.04%
Ground Access	Bus, shuttles	3	271	0.01	0.02	278	0.26%
Public Subtotal						**316**	**0.30%**
Subtotal	**Airport Scope 3**		**93,972**	**4**	**0**	**94,153**	**88.85%**
Total CO_{2e} emissions (tons)			**105,786**	**4**	**0**	**105,973**	**100.00%**

Source: Coffman Associates analysis
Note: Subtotals and totals may not add up due to rounding.

Federal Criteria Pollutants Emissions Inventory

In addition to GHGs, for which no federal standards for aviation-related emissions have been adopted, an emissions inventory for federal criteria pollutants has also been prepared. Federal criteria pollutants are regulated under the National Ambient Air Quality Standards (NAAQS) and include carbon monoxide (CO), ozone (O_3), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$), and lead (Pb). An operational emissions inventory was conducted using the FAA's Emissions and Dispersion Modeling System (EDMS), Version 5.1.4.1. It calculates emissions of pollutants associated with an airport, including aircraft, ground support equipment, and automobiles. For the purposes of evaluating pollutants, the fleet mix summarized in **Table 3D** was used in EDMS. Based on these operations, the annualized emissions, expressed in tons, is summarized in **Table 3G**. It should be noted that ozone and lead emissions are not calculated by EDMS; however, volatile organic compounds (VOC) and nitrogen (NO_X) are precursors to ozone. Ground-level ozone is not emitted directly into the air, but is created by chemical reactions between oxides of NO_X and VOCs in the presence of sunlight. As a result, VOC and NO_X emissions are used to estimate ozone emissions.

TABLE 3G
2014 Emissions Inventory (Tons per Year)
Albuquerque International Sunport

Pollutant[1]	Existing Condition
CO	2,494.58
VOC	394.09
NO_X	607.33
SO_X	74.37
PM_{10}	19.98
$PM_{2.5}$	19.57

[1] EDMS does not calculate emissions for lead
Source: Coffman Associates analysis.

POTENTIAL OPPORTUNITIES FOR PERFORMANCE IMPROVEMENT

As previously discussed, airports have no authority to reduce aircraft emissions; however, other opportunities exist to reduce emissions from vehicles, airside facilities, and buildings. The opportunities listed below will be further evaluated, along with other sustainability initiatives that will be later identified as part of a subsequent task in the sustainability master planning process.

- Continue to replace incandescent and quartz airfield lighting fixtures with LED fixtures to reduce energy consumption;
- Consider installation of pre-conditioned air at each aircraft boarding gate. These systems heat or cool air, depending on the season, that is delivered directly to aircraft during boarding and deplaning. These systems can reduce fuel use, which in turn reduces emissions;
- Promote the reduction or elimination of idling by automobiles in an around the Sunport. Voluntary idling results in unnecessary carbon emissions;
- As vehicles and equipment in the Sunport and tenant fleet are retired, promote purchase of replacement units powered with alternative fuels such as compressed natural gas (CNG); and
- Create an energy audit program for tenants to identify opportunities for energy use reductions.

WATER CONSERVATION AND WATER QUALITY

BACKGROUND

Fresh water is a precious resource in high demand. Population growth coupled with changing weather patterns has forced government agencies to seek out methods to preserve and improve the efficiency of the water supply for future generations. This issue is particularly important in New Mexico, where in 1996, Governor Gary Johnson created the New Mexico Drought Task Force (DTF) by Executive Order. The purpose of the DTF is to assess drought impacts and implement strategies for managing problems that occur in New Mexico due to persistent drought conditions. For example, in the April 2015 monthly drought status report, it was reported that statewide precipitation was below normal, with a statewide average of 89 percent of normal. Severe drought was reported to cover 19 percent of the State and moderate to severe drought covered 62 percent of the State.

The Albuquerque Bernalillo County Water Utility Authority (ABCWUA) supplies water and wastewater services to the greater Albuquerque metropolitan area. The Authority has prepared a *Water Resources Management Strategy*[5], with the stated purpose of providing a safe and sustainable water supply for the metropolitan area by: (1) determining and utilizing the existing water resources owned by the Authority and (2) planning and making the best choices for future supplies and management. A part of the ongoing strategy is to shift from sole reliance on aquifer-sourced water to renewable supplies, including the San Juan-Chama Drinking Water Project. This project was completed in 2008 and transports surface water from the Colorado River basin.

Severe drought was reported to cover 19 percent of the State and moderate to severe drought covered 62 percent of the State.

In 1995, the City of Albuquerque City Council adopted a water conservation ordinance intended to reduce overall per capita water use in the city, and in particular by large water users. This ordinance aimed to reduce per capita water usage from 250 to 175 gallons per person per day and to require development, adoption, and implementation of water conservation plans for customers using large amounts of water through a cooperative process with the City. A large water user is defined as a City water system customer that used or uses in excess of 50,000 gallons per day (gpd). The Sunport is classified as a large water user.

In response to the ordinance, the Sunport has prepared a *Water Use Report and Conservation Plan*, first prepared by the Water Utility Authority and CH2MHill in 2004 and updated by CDM Smith in September 2014. As stated in the plan, "water conservation is a critical and effective component of reducing water use to ensure a future water supply for the City of Albuquerque. The City of Albuquerque Aviation Department's environmental sustainability priorities intend to contribute to the well-being of the City by achieving their transportation and economic mission: using responsible planning and resource management to conserve water." Several charts and figures from the plan include water use data through 2013. They have been included in the sections below but have been updated to include 2014 water use data. The plan is included as **Appendix D** to the Master Plan.

[5] More information: http://www.abcwua.org/uploads/files/Your%20Drinking%20Water/WRMS_Update_101207.pdf

Landscape Management Plan

A *Landscape Management Plan – Landscape and Irrigation for the Albuquerque International Sunport and Double Eagle II Airport* (Landscape Management Plan), was prepared for the Aviation Department by Sites Southwest in January 2013. The purpose of this plan was to facilitate the maintenance and operations of the landscape and irrigation system for both airport facilities. This plan was designed to conform with the standards and goals of City ordinances, specifically the City of Albuquerque Waste Water Conservation Ordinance.

The Landscape Management Plan identified means for the Sunport to convert to non-potable re-use water for landscape irrigation. This conversion included four major components:

A. Substitute low water use plants for moderate and high-water use plants wherever feasible.
B. Repair and upgrade the current irrigation to work with the new planting and to increase water savings in areas not being re-landscaped.
C. The creation of retaining walls and swales to facilitate the harvesting of stormwater so it can be used to augment the irrigation.
D. The use of non-potable water for irrigation.

To date, none of the irrigated areas of the Sunport have been converted to non-potable re-use water. Prior to any conversion, a new pump station is required, and additional coordination is needed with the Water Authority.

Stormwater Pollution Prevention Plan

The Sunport has a Stormwater Pollution Prevention Plan (SWPPP), which was prepared on April 9, 2012. The SWPPP is meant to protect water quality and comply with requirements of the Multi-Sector General Permit (MSGP) for Stormwater Discharges Associated with Industrial Activity. This document identifies potential pollutant sources on the Sunport and includes a log of recent spills and leaks of hazardous materials. Control measures are also outlined in the form of Best Management Practices (BMPs) designed to reduce the potential for stormwater pollution. The SWPPP is currently in the process of being updated to meet new requirements of the EPA's 2015 MSGP.

Spill Prevention, Control, and Countermeasure Plan

The Sunport also has a Spill Prevention, Control, and Countermeasure Plan (SPCC Plan), that was most recently revised in January 2014. The purpose of the SPCC Plan is to describe measures implemented by the Aviation Department that together form a comprehensive spill prevention program minimizing the potential for discharges of oil from Sunport facilities; to prepare Department personnel to respond to spills in a safe, effective, and timely manner; and to mitigate the impacts of a discharge.

According to this plan, the Sunport has 13 fixed oil storage containers for material, such as diesel fuel, oil, waste oil, unleaded fuel, gear oil, and kerosene with a combined storage capacity of 22,810 gallons. As of the date of the plan (January 2014), only one documented spill had occurred in the previous 12-

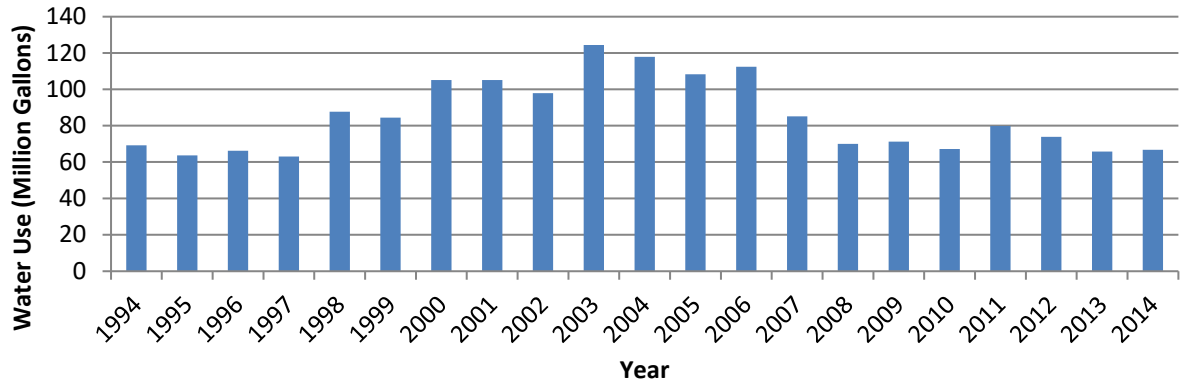
month period, which involved approximately 30 to 50 gallons of diesel fuel spilled when the fueling agent was transferring fuel from one tank to another. No significant spills that would require the notification of the U.S. EPA Regional Administrator occurred during the same period. The SPCC is currently in the process of being updated and will include an updated list of documented spills at the Sunport.

CURRENT WATER USE

The Aviation Department is currently invoiced for 38 water accounts that can be categorized as being either active building, active landscape, mixed, or inactive. Building or indoor use includes meters serving buildings and seasonal water use associated with cooling systems. Landscape or outdoor use includes seasonal landscape irrigation. Mixed-use meters serve both indoor and outdoor purposes. Each account is monitored by a water meter located on the Sunport. **Exhibit 3A** depicts the locations of the active domestic (building), active landscape (irrigation), and active mixed-use meters.

A 20-year history of the total water use at the Sunport is depicted on the following chart. This data combines all Sunport water usage, including landscape meters, building meters, and mixed-use meters. The chart shows the Sunport's water use grew substantially from 1994 (69.2 million gallons [mg]) to 2003 when it reached its peak water usage at over 124 million gallons (mg). Much of this increase in water usage can be attributed to the development of new Sunport facilities and expanded landscape irrigation demands. Water use has steadily declined since 2003, reaching its lowest point since 1995 in 2013 with 65.7 mg of water used. This is a water use reduction of 47 percent in only a 10-year period. In 2014, water use rose by 1.6 percent over the previous year to 66.7 mg of water consumed.

Total Water Use 1994-2014
Albuquerque International Sunport



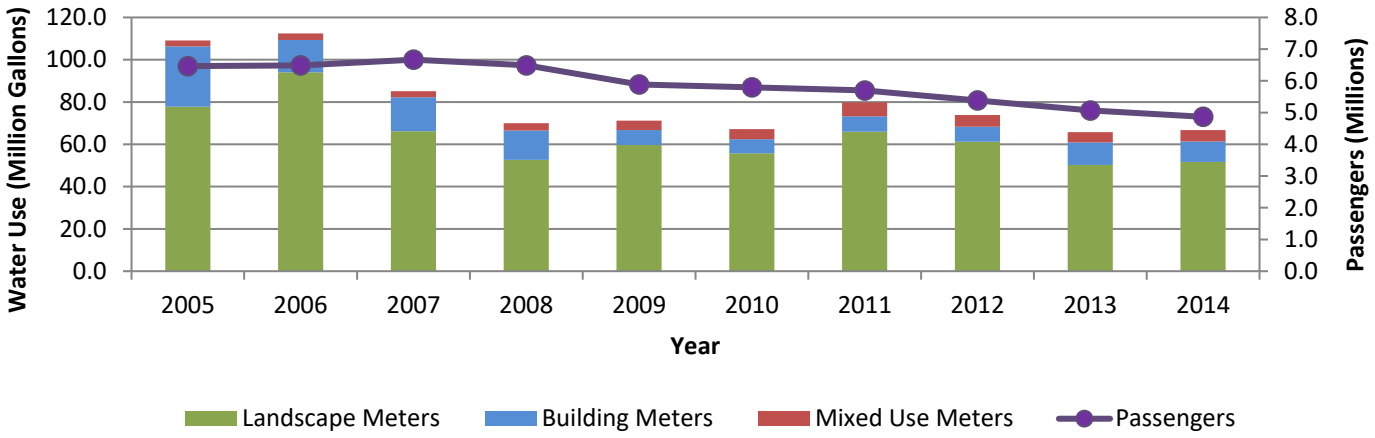
Source: ABQ Water Consumption Data Records

The next chart provides this water use breakdown by meter type since 2005, which is when the Department began categorizing its water meters. It is evident from the chart that landscaping accounts for most water use at the Sunport, averaging almost 80 percent of metered water use over the ten-year period. For the same period, buildings on average accounted for 15 percent and mixed-uses accounted for five percent. This chart also compares water use alongside total passengers (enplanements and

Exhibit 3A
WATER METER LOCATIONS

deplanements) indicating that the reduction in water consumption does not correlate entirely with commercial passenger travel.

Cumulative Annual Landscape, Building, and Mixed Water Consumption 2005-2014
Albuquerque International Sunport



Sources: ABQ Water Consumption Data Records and Passenger Records

Water use charges vary by the type of water meter. Rates include irrigation water institutional, irrigation water commercial, water commercial, and water institutional rate. **Table 3H** provides a summary of the rates charged for each category and the total 2014 charges. As expected, irrigation water accounts for most of the water used and charges at the Sunport. The Sunport was charged over $206,500 for water used in 2014.

TABLE 3H
Water Rates and Charges
Albuquerque International Sunport

Water Rate Category	2014 Rate*	Water Used (gallons)	2014 Charges (dollars)
Irrigation Water Commercial	$0.007/gallon	41,888	$295.04
Irrigation Water Institutional	$0.003/gallon	53,931,548	$135,861.12
Water Commercial	$0.028/gallon	70,312	$1,946.25
Water Institutional	$0.005/gallon	12,853,632	$68,458.63
Total		**66,897,380**	**$206,561.04**

*Rates are rounded and were calculated by dividing total charges by gallons used.
Source: ABQ Water Consumption Data Records

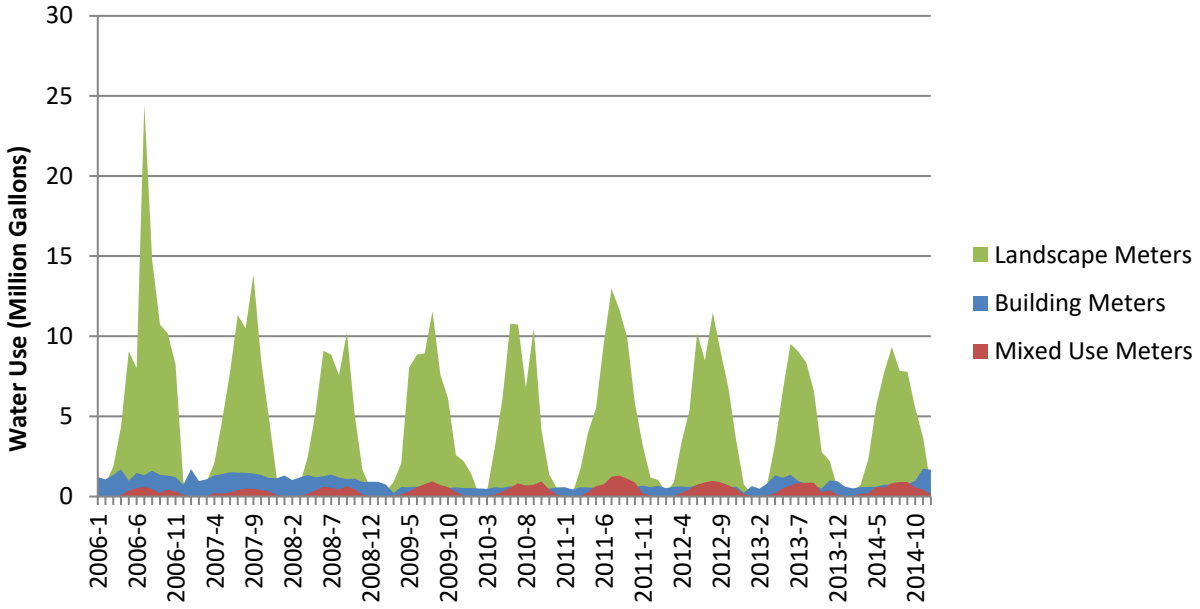
The next chart presents a monthly breakdown of water use by meter type. As might be expected, water use fluctuates throughout the year with peaks during the summer months due to landscape irrigation demands. Landscape improvements along Sunport Boulevard and other areas surrounding the Sunport were completed in 2006 resulting in a decrease in outdoor water use as observed through 2008. Improvements included xeric landscaping that uses less water, the capture of stormwater by creating

swales in terrain, and the installation of computer-controlled irrigation systems that provide for more efficient water use. The Sunport Boulevard landscape design received an award for water conservation from the New Mexico Chapter of the National Association of Industrial & Office Properties. Since 2008, the Sunport has sustained between 50 and 66 mg of landscaping water use. A slight uptick in landscaping water use was experienced during the summers of 2011 and 2012 when drought conditions were experienced.

The Sunport currently irrigates approximately 75.1 acres of landscaping. The ABCWUA has established a landscape irrigation water budget based upon total area irrigated. The initial budget was set at 34.5 mg a year but was raised to 56.3 mg in 2010. As of 2014, the Sunport's landscape irrigation use was at 51.7 mg or 92 percent of the budget.

Building water usage has experienced a significant decline over the years. From 2006 to 2008, buildings averaged 10.4 mg of water use each year. Upgrades to water fixtures in the terminal restrooms and in kitchen facilities resulted in an overall reduction to where buildings averaged only 8.1 mg of water use from 2009 to 2014.

Landscape, Building, Mixed Use Monthly Water Use 2006-2014
Albuquerque International Sunport



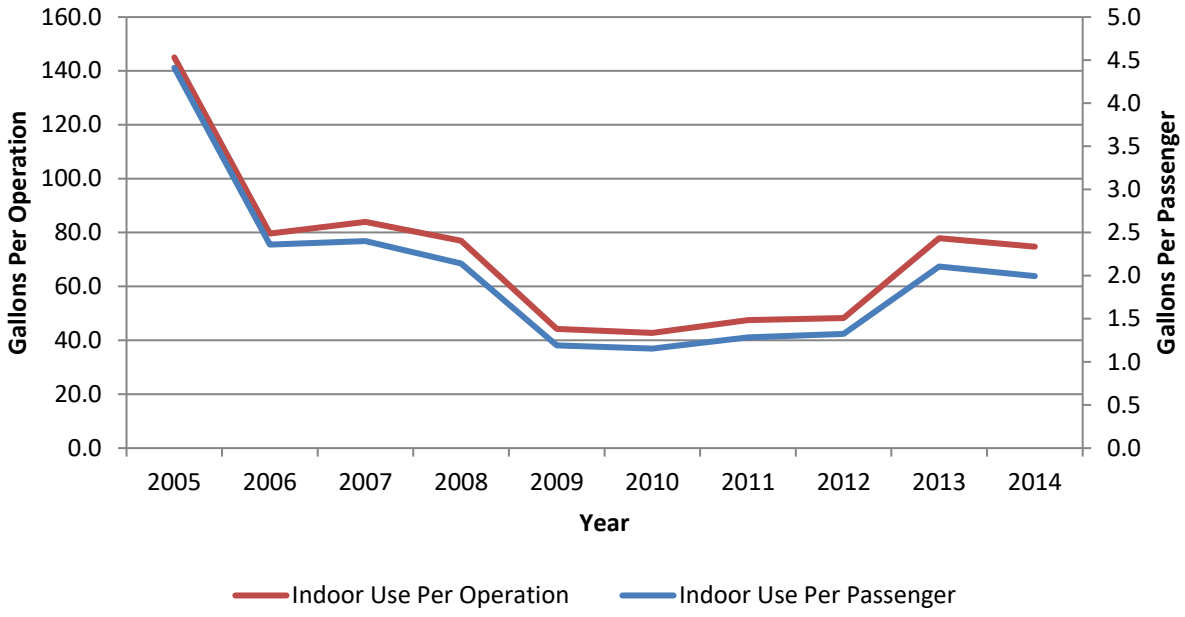
Source: ABQ Water Consumption Data Records

To account for fluctuations in Sunport activity, indoor water usage (building meters) was compared to two key performance indicators (total passengers and total operations) for the period 2005-2014. This comparison is displayed on the following chart. Water use per passenger declined from a high of 4.4 gallons per passenger (gpp) in 2005 to a low of 1.15 gpp in 2010 and averaged 2.04 gpp over the period. While 2014 had a below average consumption rate of 1.99 gpp, it was still a slight uptick from that

experienced from 2009 to 2012. According to the Water Use Report and Conservation Plan, a study on water use at international airports indicates that indoor consumption per passenger ranges from 3.0 to 5.0 gpp. The Sunport's 2014 figure (1.99 gpp) is 34 percent below the international range.

The comparison with total operations accounts for the other operational segments that occur at the Sunport, including air cargo and general aviation (military activity was not included as it is associated with Kirtland Air Force Base and does not significantly contribute towards Sunport water usage). This comparison resulted in a high of 145.0 gallons per operation (gpo) in 2005 to a low of 42.7 gpo in 2010. This figure has grown in recent years to 74.7 gpo in 2014. The average gpo over this period is 74.1 gpo; however, the previous five-year period averaged 58.2 gpo.

Indoor Water Use Per Operation and Passenger
Albuquerque International Sunport



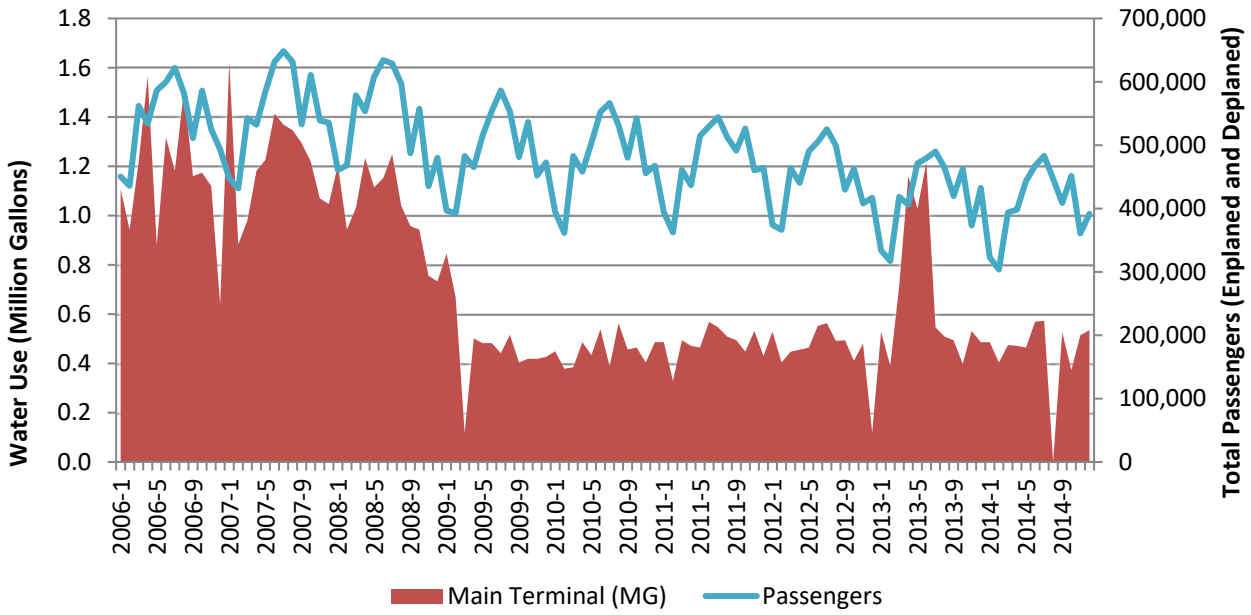
Sources: ABQ Water Consumption Data Records; FAA Operations Network (OPSNET); Sunport Passenger Records

The passenger terminal building is by far the largest building water consumer with 55.4 percent of all building consumption in 2014. The next chart presents a monthly comparison of the passenger terminal meter water use to total passengers from 2006 to 2014. This chart shows the seasonal fluctuation in passenger travel at the Sunport and the correlating water use, which also shows slight seasonal fluctuations. Over this period, passenger traffic peaks during the summer months with July averaging 9.7 percent of passengers, followed by June with 9.5 percent. June is the peak usage month on average at 10.2 percent followed by April at 9.8 percent. Strangely, January is the third highest average water use month at 9.5 percent, even though it is the second lowest average month for passenger traffic at 6.8 percent. The four-month period (March through June) in 2013 saw

The passenger terminal building is by far the largest building water consumer with 55.4 percent of all building consumption in 2014.

an unusually high amount of water use when compared to the recent history. During that period, water use reached a peak of 2.86 gpp. That same four-month period experienced a peak of 1.22 gpp in 2014 and 1.09 gpp in 2012. An explanation for this substantial increase in water use in 2013 could not be found in the available data.

Main Terminal Water Use and Total Passengers
Albuquerque International Sunport



Sources: ABQ Water Consumption Data Records; Sunport Passenger Records.

POTENTIAL OPPORTUNITIES FOR PERFORMANCE IMPROVEMENT

The Water Use Report and Conservation Plan made several recommendations for consideration to further reduce water consumption and save the Aviation Department on water use fees. These recommendations include:

- Expand fixture replacement to all outdated fixtures.
- Install sub-metering for concessionaires, cooling equipment, restrooms, and irrigation on mixed-use meters to provide information for better measurement and management of water usage.
- Convert to reclaimed water for irrigation use (cost of reclaimed water is 80 percent of potable water). An existing reclaimed water pipeline is located next to or within 500 feet of nine irrigation meters.
- Convert cool season turf (high water user) areas to more efficient warm season turf.
- Implement both low impact development (LID) and green infrastructure techniques. LID techniques include curb cutting between paved and landscaped areas, infiltration trenches,

stormwater harvesting, and reuse. These will result in improved stormwater runoff quality as well as reduced water use for landscape irrigation.

- Disconnect unused water meters. Five meters are currently unused and accrue over $4,800 in fees each year.

SURFACE TRANSPORTATION

BACKGROUND

As a multi-modal transportation hub, airports connect air transport with various surface transportation modes. Sustainable surface transportation modes, such as bicycle, alternative fuel vehicles, and public transportation need to be a priority in any long-term plan to address air quality issues and natural resource consumption. This section will examine the available surface transportation modes available at the Sunport and surrounding area and identify regional planning efforts to expand alternative surface transportation infrastructure that could benefit users of the Sunport.

Existing Transportation Plans/Programs

- *2035 Metropolitan Transportation Plan* (MTP): The MTP is a long-range planning document adopted by the Metropolitan Transportation Board (MTB) on April 15, 2011 and amended most recently on May 16, 2014. One of the key strategies identified in the MTP is to develop programs that encourage and educate people about walking, bicycling, and taking public transit. The MTP contained data pertaining to the number of people commuting to work by walking and bicycling. The data showed that the percentage of commuters in the City of Albuquerque walking to work dropped to 2.1 percent (2005-2009 estimate) from 2.7 percent (2000 Census). The number of people commuting by bicycle grew in the City of Albuquerque from 1.1 percent (2000 Census) to 1.2 percent (2005-2009 estimate).

    - Future study projects identified in the MTP include a modern rail system for a streetcar line that could serve the Sunport; however, a detailed description of this project was not provided in the plan. Another project identified is the extension of Sunport Boulevard from Broadway Boulevard to Interstate 25, Exit 221. This project would include a new 4-lane divided facility with bike lanes. The MTP also proposes to improve bikeways/trails in the vicinity of the Sunport by adding paths leading to the Sunport on University Boulevard from Gibson Boulevard to Sunport Boulevard and from 2nd Street to Broadway Boulevard.

- *Clayton Heights Metropolitan Redevelopment Area Plan*: This plan, prepared for the Albuquerque City Council and adopted on June 7, 2010, examined strategies for revitalization of the Clayton Heights area, a neighborhood located immediately north/northwest of the Sunport. This plan identified that the City is studying the feasibility of a streetcar system to provide service between the Sunport and the downtown Rail Runner station. A proposed routing would utilize Yale Boulevard in both travel directions south of Avenida Cesar Chavez. Proposed stops along this route

would be located at approximately ¼-mile intervals and occur along Cesar Chavez at University, at the University of New Mexico Football stadium, and at the Veloport. Stops along Yale Boulevard would be located at Cesar Chavez, Kathryn, Ross and north of Gibson.

- Clear the Air Challenge: The City of Albuquerque has implemented this citywide program to improve regional air quality by promoting the use of alternative transportation, such as walking, biking, carpooling, and taking the bus.

- The City of Albuquerque has a program to ensure commuters who regularly use alternative modes of transportation instead of single-occupancy vehicles (SOV) can make it to their destination in emergency situations. People who choose to carpool/vanpool, ride the bus, bike, or walk at least three times a week can call in emergency situations and have a driver sent to get you to your destination. The program covers trips within the ABQ RIDE bus route service area. The City implemented this program to make alternative transportation modes a safer and easier option to SOVs.

- *Bikeways & Trailways Facilities Plan*: This plan was adopted by the Albuquerque City Council on May 18, 2015. This plan was prepared to promote a well-connected, enjoyable and efficient, non-motorized transportation and recreation system throughout the metropolitan area. The vision statement of this plan was to, "provide access for cyclists, pedestrians, and trail users to all areas of Albuquerque to encourage cycling and walking as viable transportation options and to provide recreation opportunities, which result in an improved quality of life in the Albuquerque Metropolitan Area." Goals of this plan included: 1) Improve and enhance cycling and pedestrian opportunities. 2) Develop a continuous, interconnected, and comprehensive system of bikeways and trails. 3) Enhance maintenance of all bikeways and trails. 4) Increase use of the bikeway and trails network. 5) Increase public awareness and education related to bikeways and trails. 6) Recognize and leverage the bikeway and trail network as an integral part of economic development and quality of life in Albuquerque. 7) Streamline administrative practices and coordination. At the time of this plan, the City's bikeway system consists of 480 miles of on-street bicycle facilities and multi-use trails.

TRANSPORTATION MODES

Bus/Commuter Rail

The City's ABQ RIDE bus system consists of over 40 bus routes, three of which serve the Sunport. The bus route system in the vicinity of the Sunport is depicted on **Exhibit 3B**. The Sunport passenger terminal bus stop is located on Sunport Boulevard at the west end of the baggage claim area (level 1). The 250 Airport/Downtown route is a non-stop weekday only service between the Sunport and the downtown Alvarado Transportation Center (ATC). The Rio Metro Regional Transportation District funds this route. Route 50: Airport/Yale/Downtown provides service between the Sunport and the ATC making four stops between the two locations. Route 50 departs the Sunport every half hour beginning at 7:00 a.m. until 8:00 p.m. every weekday and every hour from 9:45 a.m. until 6:50 p.m. on Saturdays. Route 222

DOWNTOWN

Alvarado Transportation Center

ABQ RIDE

UNM

CNM

VA HOSPITAL

ALBUQUERQUE SUNPORT

KIRTLAND AFB

New Mexico RAIL RUNNER Commuter Express

Historic Route 66

I-25 N

Kirtland Air Force Base

Puerto Del Sol Golf Course

Los Altos Golf Course

Phil Chacon

Harrison Middle School

LEGEND

- 700 **Rapid Ride Routes:** Fast, frequent service
- 15 **Regular Routes:** Local all day service
- 15 **Commuter Routes:** Peak hours only
- 15 **Service Variation:** See schedule
- Albuquerque Transit Center **ABQ Ride Transit Center**
- P **Park and Ride**
- **Rail Runner Stations**

Source: City of Albuquerque Transit Department

Exhibit 3B
BUS ROUTES NEAR SUNPORT

This page intentionally left blank

provides weekday service between Rio Bravo and Area 4 (Kirtland Air Force Base), which includes a stop at the Sunport passenger terminal building. A summary of the three routes is included in **Table 3J**.

TABLE 3J
ABQ RIDE Routes Serving the Sunport

Route	Arrivals	Departures	Stops
250: Airport/Downtown	Weekday: 7:30a; 9:05a; 2:57p; 6:10p; 6:45p; 7:22p; 8:38p	Weekday: 9:10a; 4:01p; 6:10p	Non-stop to ATC
50: Airport/Yale/Downtown	Weekday: Every half hour beginning 6:58a until 7:58p. Saturday: Every hour beginning 9:40a until 6:45p.	Weekday: Every half hour beginning 7:00a until 8:00p. Saturday: Every hour beginning 9:45a until 6:50p	6
222: Rio Bravo – Sunport – Kirtland	Weekday: 6:23a; 7:10a; 7:19a; 2:21p 3:03p; 4:16p; 5:33p; 6:13p	Same as arrivals	8

Source: ABQ RIDE System Route Schedule; effective May 2, 2015

Records obtained from the City of Albuquerque and summarized in **Table 3K**, indicate that bus ridership at the Sunport grew to a five-year high of 40,416 in fiscal year 2014 with an average of 111 people utilizing buses to/from the Sunport daily. Over this five-year period, ridership at the Sunport has grown 11.2 percent. Total ABQ RIDE ridership over this same period has grown at 16.4 percent to over 13 million passengers in FY 2014. As a percentage of the total ABQ RIDE ridership over the past five years, the Sunport has maintained an average of 0.29 percent.

Bus ridership at the Sunport grew to a five-year high of 40,416 in fiscal year 2014.

TABLE 3K
ABQ RIDE Sunport Fixed Route Ridership

	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
Sunport Ridership	36,335	33,977	35,708	34,478	40,416
Sunport Avg. Daily Ridership	100	93	98	95	111
Total ABQ RIDE Ridership	11,177,097	11,907,798	12,821,051	12,906,239	13,009,047
Sunport Ridership %	0.33%	0.29%	0.28%	0.27%	0.31%

Source: City of Albuquerque ABQ RIDE Records

Route 222 also provides service from the Sunport to a New Mexico Rail Runner Express station. The New Mexico Rail Runner Express is a commuter rail system administered by the New Mexico Department of Transportation (NMDOT) connecting multiple communities to the ABQ RIDE system, including Santa Fe, Kewa Pueblo, Bernalillo, Sandia Pueblo, Los Ranchos, Belen, Los Lunas, and Isleta Pueblo to the City of Albuquerque. The rail system has 11 stations. Travelers going to the Sunport utilizing the rail system can utilize ABQ RIDE routes 250 and 50 from the downtown ATC station or Route 222 from the Bernalillo County station[6]. The same bus routes can be used for travelers coming from the Sunport to the rail system.

[6] More detailed route information available at: http://riometro.org/rio-metro-schedules/airport/going-to-the-airport.

The downtown ATC station also serves as a connecting point to nationwide Amtrak rail service and Greyhound bus lines. Amtrak's Southwest Chief line makes one stop in each direction each day at the ATC station. The Southwest Chief line is a 2,265-mile route that connects Chicago and Los Angeles. Greyhound provides busing service from Albuquerque to St. Louis, Phoenix, Denver, and El Paso.

Bicycle/Pedestrian

The City of Albuquerque has made a commitment to expand the on-street bikeway and multi-use trail system to make bicycle commuting a viable transportation alternative. The City also promotes the use of the ABQ RIDE system for cyclists traveling in higher traffic areas by equipping public buses with bike racks. The bikeway system consists of the following bikeways:

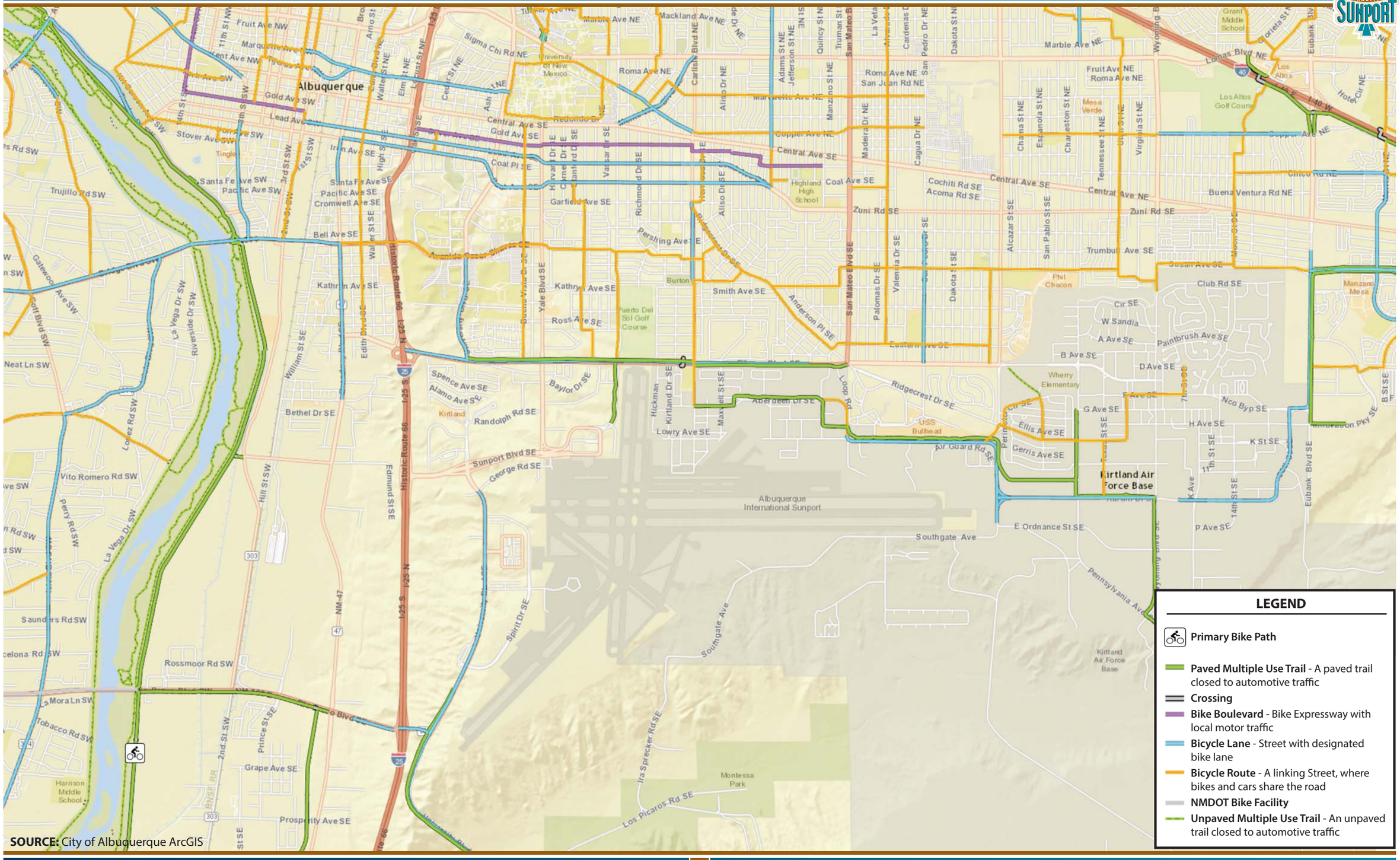
- Multi-use Trail – a paved trail closed to automotive traffic
- Bicycle Lane – a portion of the street with a designated lane for bicycles
- One-way Bicycle Lane – single direction lane indicated by arrows
- Bicycle Route – cars and bicycles share the street
- Bicycle Boulevard – a shared roadway optimized by bicycle traffic
- Unpaved Multiple Use Trail – an unpaved trail, maintained and closed to automotive traffic

Source: Rio Metro Transit District

Exhibit 3C depicts the Sunport vicinity bicycle route map. Gibson Boulevard north of the Sunport is equipped with both a multi-use trail and a bicycle lane that accesses the Sunport area from the citywide bikeway system. A multi-use trail runs parallel to Girard Boulevard south of Gibson Boulevard but does not extend to the Sunport passenger terminal. The passenger terminal building is not equipped with storage containers or lockers for public or employee use, but a bicycle rack is located at the east end of the arrival level of the facility. Data pertaining to the use of the bicycle rack is not collected; however, ABQ staff indicated that Sunport employees routinely utilize the bicycle rack.

The City's Parks and Recreation Department operates the Esperanza Bicycle Safety Education Center, which promotes bicycle education to increase the safety, self-sufficiency and comfort of recreational, fitness, and utility riders. The Albuquerque Bike Share (BICI) project[7] is a pilot program initiated on May 15, 2015, (Bike to Work Day) by the DowntownABQ Main Street Initiative, the Mid-Region Council of

[7] More information at: http://zagster.com/abq/


Albuquerque
Fruit Ave NW
Marquette Ave NW
Gold Ave SW
Lead Ave SW
Stover Ave SW
Tingley Dr SW
Santa Fe Ave SW
Pacific Ave SW
Trujillo Rd SW
Gateway Blvd SW
Golf Blvd SW
Neat Ln SW
Lorez Rd SW
La Vega Dr SW
Riverside Dr SW
Vito Romero Rd SW
Perry Rd SW
Saunders Rd SW
Rossmoor Rd SW
La Mora Ln SW
Tobacco Rd SW
Harrison Middle School
Grape Ave SE
Prosperity Ave SE
Bethel Dr SE
Kathryn Ave SE
Bell Ave SE
Irving Blvd SE
Santa Fe Ave SE
Pacific Ave SE
Cromwell Ave SE
Coal Pl SE
Central Ave SE
Gold Ave SE
Garfield Ave SE
Pershing Ave SE
Burton
Smith Ave SE
Ross Ave SE
Puerto Del Sol Golf Course
Yale Blvd SE
William St SE
Edith Blvd SE
Spence Ave SE
Alamo Ave SE
Kirtland
Randolph Rd SE
Baylor Dr SE
Sunport Blvd SE
George Rd SE
Edmund St SE
Hill St SW
Historic Route 66
I-25 N
I-25 S
NM-47
303
47
25
Spirit Dr SE
Prince St SE
2nd St SW
BNSF RR
Ira Sprecker Rd SE
Los Picaros Rd SE
Montessa Park
Southgate Ave
Albuquerque International Sunport
Kirtland Air Force Base
E Ordnance St SE
Air Guard Rd SE
Gerris Ave SE
Ellis Ave SE
USS Bullhead
Lowry Ave SE
Aberdeen Dr SE
Ridgecrest Dr SE
Eastern Ave SE
Hickman
Kirtland Dr SE
Maxwell St SE
Lodo Rd
Wherry Elementary
A Ave SE
B Ave SE
D Ave SE
F Ave SE
G Ave SE
H Ave SE
K St SE
Nco Byp SE
Paintbrush Ave SE
Club Rd SE
Susan Ave SE
Trumbull Ave SE
Phil Chacon
W Sandia
Cir SE
Manzano Mesa
Innovation Pky SE
Eubank Blvd SE
Anderson Pl SE
San Mateo Blvd SE
Palomas Dr SE
Valencia Dr SE
Dakota St SE
Alcazar St SE
San Pablo St SE
Zuni Rd SE
Cochiti Rd SE
Acoma Rd SE
Central Ave NE
Buena Ventura Rd NE
Highland High School
Coal Ave SE
Cagua Dr NE
Madeira Dr NE
Copper Ave NE
Roma Ave NE
San Juan Rd NE
Marble Ave NE
Mackland Ave NE
Carlisle Blvd NE
Aliso Dr NE
Adams St NE
Jefferson St NE
Quincy St NE
Truman St NE
San Mateo Blvd NE
Pedro Dr NE
Dakota St NE
Fruit Ave NE
Roma Ave NE
Mesa Verde
Charleston St NE
Tennessee St NE
Virginia St NE
Chama St NE
Espanola St NE
Los Altos
Los Altos Golf Course
Lomas Blvd NE
I-40 W
Hotel Cir NE
Wyoming Blvd NE
Grant Middle School
Loretta St NE
Eubank Blvd NE
Sigma Chi Rd NE
University of New Mexico
Tucker Ave NE
Ash St NE
Cedar St NE
Elm St NE
Locust St NE
Walter St NE
Arno St NE
Broadway Blvd SE
Richmond Dr SE
Carmel Dr SE
Harvard Dr SE
Vassar Dr SE
Aliso Dr SE
Madeira Dr SE
Valencia Dr SE
Palomas Dr SE
Dakota St SE
Alcazar St SE
San Pablo St SE
Zuni Rd SE
Trumbull Ave SE
Club Rd SE
Susan Ave SE
Manzano Mesa
Innovation Pky SE
Eubank Blvd SE
Wyoming Blvd SE
Pennsylvania Ave SE
Kirtland Air Force Base
P Ave SE
K Ave
14th St SE
11th St SE
Nco Byp SE
H Ave SE
K St SE
G Ave SE
F Ave SE
D Ave SE
B Ave SE
A Ave SE
W Sandia
Cir SE
Paintbrush Ave SE
Club Rd SE
Susan Ave SE
Trumbull Ave SE
Phil Chacon

This page intentionally left blank

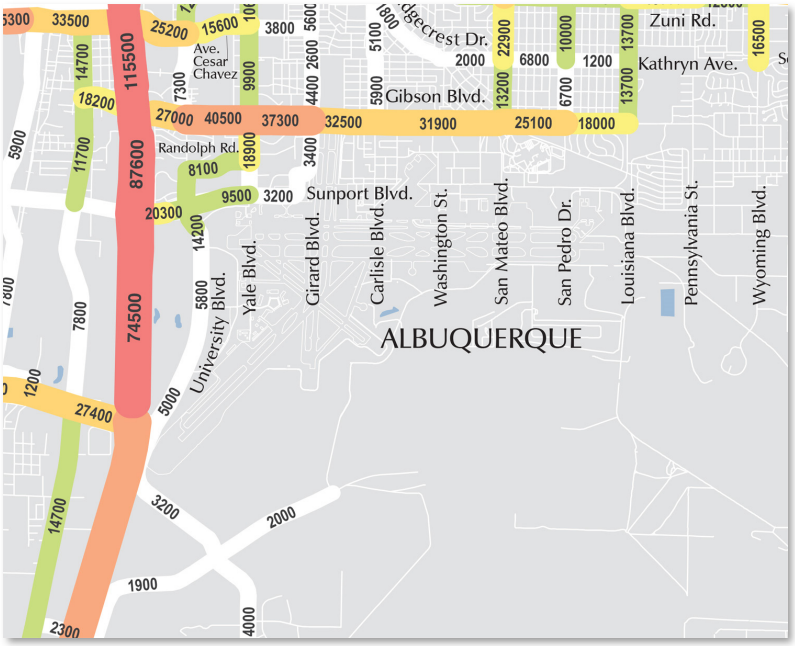
Governments (MRCOG). The project provides 65 bicycles that are shared on a short-term basis by residents and visitors within the downtown area at 13 different locations. The one-year pilot project does not extend to the Sunport at this time but has the potential to be expanded in the future.

The Albuquerque Aviation Police has developed a bicycle patrol program to improve response time and to detect criminal activity. These patrols have much smaller carbon footprints with zero emissions generated. The bike patrol also provides better speed and mobility than foot patrol and access to areas where patrol vehicles are often limited. Bike patrol areas include the terminal, parking structures, and the rental car facility.

Pedestrian sidewalks are available along many of the vicinity roadways, including the Sunport passenger terminal loop road. The sidewalks connect to the citywide network of sidewalks making it possible for passengers and employees to walk to the Sunport. The City promotes walking when possible for its health and environmental benefits; however, walking is not the primary surface transportation mode to access the Sunport for most travelers and workers.

Personal Vehicle

The primary surface transportation mode available to access the Sunport is vehicle roadways. Direct access to the passenger terminal loop is via Sunport Boulevard, Yale Boulevard, and Girard Boulevard. Traffic counts detailed on the graphic below indicate that in 2013 there was an average of 9,500 daily vehicles in and out of the Sunport via Sunport Boulevard and 3,400 from Girard Boulevard. Yale Boulevard is shown to have averaged 18,900 daily vehicles in 2013.



Vehicle parking lots are available on- and off-airport providing 11,233 total parking spaces for both passengers and employees of the Sunport. None of the Sunport parking lots offer priority parking spaces for low-emission vehicles (electric vehicles [EV], hybrid, compressed natural gas [CNG], hydrogen, etc.), nor do the employee parking lots provide for priority parking spaces for carpool/vanpooling employees. The Sunport has a cell phone waiting lot with 54 spaces that allows greeters to wait temporarily in a free parking lot until an arriving passenger is ready for pickup. Cell phone lots are a benefit to airports by managing terminal curb congestion and deterring greeters from circling the terminal loop road. This reduction in vehicle circulation also lessens vehicle emissions, which has a cumulative positive impact on regional air quality.

A search for EV charging stations on PlugShare.com[8] identified 26 EV charging stations in the Albuquerque area of which 13 are available for public use. The nearest EV charging station to the Sunport is the FastPark & Relax station at 2801 Yale Boulevard. There are no EV charging stations on Sunport property. A CNG station operated by Clean Energy is available on Sunport property at 2200 Sunport Boulevard. According to the U.S. Department of Energy's Alternative Fuels Data Center[9], there are no hydrogen vehicle fueling stations in the State of New Mexico. Biodiesel, liquefied natural gas (LNG), and liquefied petroleum gas (propane) stations are available at various locations in the State, but none are located on or adjacent to the Sunport.

Carpooling or vanpooling is an alternative to using SOV that involves two or more commuters sharing an employee-owned vehicle. The City of Albuquerque maintains a free carpool matching service for residents. A program website[10] is available for people to sign-up and search for other commuters that live nearby and have similar schedules and driving preferences. This service is available for employees of the Sunport and its tenants.

Taxi/Shuttle/Rental Services

Several companies provide taxi/limousine/shuttle services to the Sunport, including Albuquerque Cab Company; Yellow Cab Company; ABQ Green-Cab Company; American Limousine; Star Limo; Carey Southwest Limousine; Sunport Shuttle; Sandia Shuttle; and RoadRunner Shuttle & Charter. Current taxi rates from Albuquerque Cab Company include an initial drop charge of $2.50 and a per mile charge of $2.20. At this rate, a ride to downtown Albuquerque (approximately 3.3 miles) would cost $9.76.

Mobile app-based vehicle-for-hire options such as Uber are also available to travelers at the Sunport. Uber operates a ride-booking service, which utilizes smartphone applications to connect people seeking rides with drivers. Uber's website allows users to get fare estimates for travel within its market cities. A search for a fare estimate from the Sunport to downtown Albuquerque (approximately 3.3 miles) resulted in a range of $17 to $23.

In addition to taxi and shuttle services, ten companies provide rental car services at the Sunport, including:

- Hertz
- Alamo
- National
- Advantage
- Dollar
- Thrifty
- Enterprise
- Payless
- Budget
- Avis

[8] More information at: www.plugshare.com
[9] More information at: http://www.afdc.energy.gov/
[10] More information at: https://www.carpoolworld.com/cabq.html

POTENTIAL OPPORTUNITIES FOR PERFORMANCE IMPROVEMENT

The City has made it a priority to improve and promote alternative transportation modes available to commuters and visitors. The Aviation Department has numerous opportunities to contribute towards those efforts. Some opportunities for further enhancing alternative surface transportation at the Sunport include, but are not necessarily limited to, the following:

- Expand on-site bicycle facilities for public use and coordinate with the City to connect the terminal to the citywide bicycle trails and paths. Monitor the BICI pilot bike share project and promote the Sunport as a future expansion site. Promote bicycling to Sunport employees by providing end-of-trip facilities, including employee showers, lockers, and bicycle parking.
- Provide priority parking locations to carpools/vanpools and alternatively fueled vehicles. Promote the City's carpool matching service to employees and travelers on the Sunport website.
- Post no-idling signage at the terminal curb and in the cell phone waiting lot to reduce vehicle emissions.
- Incentivize employee use of public transit by subsidizing bus passes.
- Install on-site EV charging stations and explore adding an alternative fuel station (biodiesel, CNG, LNG, propane, hydrogen).
- Utilize social media and other public outlets and media to promote the use of public transit or cycling to/from the Sunport.

NATURAL RESOURCE MANAGEMENT

BACKGROUND

Airports by their nature require massive amounts of natural resources, from the construction of massive airfield and landside facilities to the materials purchased for everyday operation. In many cases, airports are one of the largest consumers of natural resources within a city government. Considering the significant amount of natural resources that go into an airport, it is important to consider how an airport sponsor manages those natural resources and the processes to ensure their efficient use.

This section will examine existing Department policies and practices that pertain to the natural resources that make up the Sunport, including the procurement of materials and supplies and construction management.

PROCUREMENT

The City's Central Purchasing Office (Purchasing Division) is the central purchasing authority for the Sunport. The Capital Implementation Program Division handles major construction and architectural and engineering services. Chapter 5, *City Property, Purchases and Sales*, of the City's Code of Ordinances, outlines the City's procurement requirements. Prospective vendors are required to register utilizing the

Secure Internet Commerce Network (SicommNet) website[11]. Once registered, vendors can review available requests for quotes (RFQs), requests for bids (RFBs), and requests for proposals (RFPs).

The Aviation Department has the authority to expend up to $500, utilizing the Small Purchase Order system, without processing the requirement through the Purchasing Division. Procurements in excess of $500 and up to $10,000 require that oral quotations be obtained prior to making the procurement and the purchase must be processed through the Purchasing Division. Procurements in excess of $10,000 require a formal competitive process be followed.

The ordinance also outlines preferences for awarding resident, local, and small businesses, which are given a five percent preference for each to the amount bid or quoted or the proposal score. The City has also set a *Small Business Goal*, which aims to award small businesses with city purchases for goods and services equivalent to ten percent of the total value of said purchases for the prior fiscal year.

Procurement is addressed within the Sunport's SMS as well. The SMS contains a sustainability initiatives plan, which identifies an immediate action to establish "green" specifications for procurement and a paper conservation program (default all printers/computers to two-sided printing). Near-term actions identified in the SMS sustainability initiatives plan include modifying procurement specifications to require that computer purchases are Energy Star[12] compliant and to develop a procurement specification for green vehicles and submit a VALE[13] application to support the purchase.

GREEN CLEANING

The Aviation Department has received certification from the Green Clean Institute (GCI), which certifies healthier indoor environments, provides professional development education for frontline staff and promotes proactive best practices within environmental health services operations. All Sunport custodial supervisors have been trained and certified as green clean technicians. Aviation Department custodial staff receives GCI training each month to educate and inform of new standards. A Train the Trainer program has also been implemented where Certified Supervisors train staff from the Green Clean Technician 101 Training Manual. Each month one chapter is reviewed, and questions are answered in a group setting, after which the staff applies their knowledge in the field.

The Aviation Department has received certification from the Green Clean Institute (GCI), which certifies healthier indoor environments, provides professional development education for frontline staff and promotes proactive best practices within environmental health services operations.

Aviation Custodial has eliminated the need for traditional chemical-based cleaners by using Activeion Ionator EXP devices[14], which utilizes tap water to clean and sanitize surfaces. Using

[11] http://www.sicomm.net/vendor-login/

[12] Energy Star is a U.S. EPA voluntary program that certifies products that save energy without sacrificing features or functionality. For more information: http://www.energystar.gov/

[13] Voluntary Airport Low Emissions (VALE) Program – FAA program designed to reduce all sources of airport ground emissions. For more information: http://www.faa.gov/airports/environmental/vale/

[14] For a video explanation on how this equipment works, visit: https://www.youtube.com/watch?v=KIRoeO_uVDU

this equipment creates a safer and more sustainable airport environment for travelers and Sunport employees. The use of this product also saves the Department money by eliminating the need to purchase multiple chemical-based surface cleaners. Another "green" initiative implemented by Aviation Custodial is the conversion to 100 percent recycled paper towels.

CONSTRUCTION MANAGEMENT

The City does have in place a Green Path Program, which encourages, and facilitates, voluntary design and construction of energy efficient buildings that substantially exceed code minimum.

The City has adopted a Uniform Administrative Code of the City of Albuquerque (Code), which serve as minimum standards regulating construction. This Code incorporates numerous international, national, state, and city building codes and applies to construction projects at the Sunport. According to Aviation Department staff, the existing Code does not include specific "green" building practices or policies. However, it was indicated that contractors recycle materials, especially concrete and asphalt, when economically feasible.

The City does have in place a Green Path Program, which encourages, and facilitates, voluntary design and construction of energy efficient buildings that substantially exceed code minimum. This program requires facilities to be LEED[15] Gold or Silver certified, which requires the incorporation of sustainable building strategies that will reduce waste, increase recycling, and incorporate the use of sustainable materials. An added incentive of the Green Path Program is that the City will expedite permitting and review times.

A search of the U.S. Green Building Council (USGBC) directory[16] identified 493 results for projects in the City of Albuquerque that either have received LEED certification or are in the certification process. The search identified one facility at the Sunport that is in the process of receiving LEED certification. The facility is identified as the Sunport Business Center I and is located at 3701 Spirit Drive SE, which is located adjacent to the Southwest Airlines Call Center building. No additional information on this facility or a timeline for completion was available.

POTENTIAL OPPORTUNITIES FOR PERFORMANCE IMPROVEMENT

The Sunport has already incorporated plans to address natural resource management within its SMS. Based upon available information, several of the action items from the SMS have not yet been incorporated or implemented. The immediate opportunities for improvement include the incorporation of these action items, as well as expanded efforts within the City to address resource conservation.

- Coordinate with the Purchasing Division to establish a "Green" Procurement Program. An emphasis should be placed on purchasing materials with recycled content and on locally sourced materials.

[15] Leadership in Energy and Environmental Design (LEED). For more information: http://www.usgbc.org/leed
[16] USGBC projects directory: http://www.usgbc.org/projects

- Establish a paper conservation program within the Aviation Department.
- Modify procurement specifications to require equipment purchases are Energy Star certified when practicable.
- Utilize the FAA's VALE program to transition to low-emission fleet vehicles when practicable.
- Expand records to monitor expenses dispersed to locally based vendors and suppliers and for materials with recycled content. These are key performance indicators (KPIs) that should be monitored on a regular basis to track "green" procurement initiatives.
- Commit to the City's Green Path Program for future new construction and major renovations of Sunport facilities.

Chapter Four

AIRPORT FACILITY REQUIREMENTS

Chapter Four

AIRPORT FACILITY REQUIREMENTS

To properly plan for the future of Albuquerque International Sunport (ABQ), it is necessary to translate forecast aviation demand into the specific types and quantities of facilities that can adequately serve the identified demand. This chapter uses the results of the forecasts presented in Chapter Two, as well as established planning criteria, to determine the airside (i.e., runways, taxiways, navigational aids, marking and lighting) and landside (i.e., hangars, aircraft parking apron, and automobile parking) facility requirements.

The objective of this effort is to identify the adequacy of existing airport facilities and outline what new facilities may be needed, and when these may be needed, to accommodate forecast demands. Having established these facility requirements, alternatives for providing these facilities will be evaluated in the next chapter.

PLANNING HORIZONS

An updated set of aviation demand forecasts for the Sunport has been established, with a summary of the primary forecasting elements presented on Exhibit 2N. These activity forecasts include commercial passenger enplanements, annual operations, based aircraft, fleet mix, and air cargo. With this information, specific components of the airfield and landside system can be evaluated to determine their capacity to accommodate future demand.

Cost-effective, efficient, and orderly development of an airport should rely more upon actual demand than on a time-based forecast figure. In order to develop a master plan that is demand-based rather than time-based, a series of planning horizon milestones have been established that take into consideration the reasonable range of aviation demand projections. The planning horizons presented in **Table 4A** are segmented as the Short-Term (approximately years 1-5), the Intermediate-Term (approximately years 6-10), and the Long-Term (years 11-20 and possible beyond).

TABLE 4A
Planning Horizon Activity Levels
Albuquerque International Sunport

		PLANNING HORIZON		
	Base Year	Short-Term	Intermediate-Term	Long-Term
Demand Indicators				
Enplaned Passengers	2,446,388	2,490,000	2,750,000	3,330,000
Total Air Cargo (tons)	55,702	60,043	61,534	63,043
Total Based Aircraft	165	170	190	220
Annual Operations				
Air Carrier	57,172	56,600	61,000	70,000
Air Cargo	10,202	10,500	10,900	11,600
General Aviation	31,478	32,400	34,800	39,700
Air Taxi	12,304	13,200	13,900	15,800
Military	18,913	18,900	18,900	18,900
Total Annual Operations	130,069	131,600	139,500	156,000

It is important to consider that actual activity at the airport may be higher or lower than what the annualized forecast portrays. By planning according to activity milestones, the resultant plan can accommodate unexpected shifts or changes in the area's aviation demand. It is important for the plan to accommodate these changes so that airport officials can respond to unexpected changes in a timely fashion.

The most important reason for utilizing milestones is it allows airport management the flexibility to make decisions and develop facilities according to need generated by actual demand levels. The demand-based schedule provides flexibility in development, as development schedules can be slowed or expedited according to demand at any given time over the planning period. The resultant plan provides airport officials with a financially responsible and needs-based program.

PEAKING CHARACTERISTICS

Many airport facility needs are related to the levels of activity during peak periods. The periods used in developing facility requirements for this study are as follows:

- **Peak Month** – The calendar month when peak aircraft operations occur.

- **Design Day** – The average day in the peak month. This indicator is derived by dividing the peak month operations by the number of days in a month.

- **Busy Day** – The busy day of a typical week in the peak month.

- **Design Hour** – The peak hour within the design day.

It is important to note that only the peak month is an absolute peak within a given year. All other peak periods will be exceeded at various times during the year. However, they do represent reasonable planning standards that can be applied without overbuilding or being too restrictive. **Table 4B** outlines the peak baseline and forecast peaking characteristics for the Sunport.

TABLE 4B
Peaking Characteristics
Albuquerque International Sunport

	Baseline (2014)	Short-Term	Intermediate-Term	Long-Term
AIRLINE ENPLANEMENTS				
Annual Enplanements	2,446,388	2,490,000	2,750,000	3,330,000
Peak Month	240,690	237,638	262,214	317,791
Design Day	7,764	7,728	8,527	10,335
Design Hour	1,250	1,250	1,390	1,680
AIRLINE OPERATIONS				
Annual Operations	57,172	53,600	57,200	65,400
Peak Month	5,260	4,931	5,262	6,017
Design Day	157	147	157	179
Design Hour	15	14	15	17
GENERAL AVIATION OPERATIONS				
Annual Operations	31,478	32,400	34,800	39,700
Peak Month	3,141	3,208	3,446	3,931
Design Day	105	107	115	131
Design Hour	10	10	11	12
TOTAL AIRPORT OPERATIONS				
Annual Operations	130,069	128,600	135,700	151,400
Peak Month	11,850	11,574	12,213	13,626
Design Day	395	373	394	440
Busy Day	486	459	485	541
Design Hour	31	29	31	35

AIRLINE PEAKING CHARACTERISTICS

In general, airport capacity and facility needs related to specific activity types will typically consider the levels of activity during a peak or design period. Determination of peaking characteristics related to airline activity is important for the planning and design of the passenger terminal building as well as associated facilities and services. The analysis is commonly utilized as a basis for determining the

appropriate size of the terminal building and the functional areas therein, including hold rooms, security checkpoints, concessions, restrooms, baggage claim area, etc. The airline peaking characteristics also relate to aircraft gates, ramp apron space, and overnight parking.

For nine of the last 10 years, the peak month enplanement total occurred in July and has averaged 9.7 percent of the annual enplaned passengers. This is anticipated to remain relatively constant in the future as it has been for the last decade.

The design day enplanement level for the peak month is the average weekday enplanements of the peak month. This is derived by dividing the peak month enplanement level by the number of days in the month. The design day for enplanements is obtained by dividing by a factor of 31.

The design hour enplanement and deplanement levels are estimated utilizing the Airport Cooperative Research Program (ACRP), Report 25, *Airport Passenger Terminal Planning and Design, Spreadsheet Models*. The primary model inputs are the airline schedule and aircraft utilization mix for an average weekday of the peak week of the peak month for operations (Tuesday, June 10, 2014). The model output is a rolling total of available seats in 10-minute increments. The peak hour for arriving seats is 14 percent of the day's total arriving seats. The peak hour for departing seats is 16.1 percent of the day's total departing seats. The arrival peak occurs late in the evening between 11:00 pm and 12:00 am. The departing peak occurs in the morning between 5:00 am and 6:00 am. **Exhibit 4A** graphically shows the rolling arrival and departing peak hour enplanement levels.

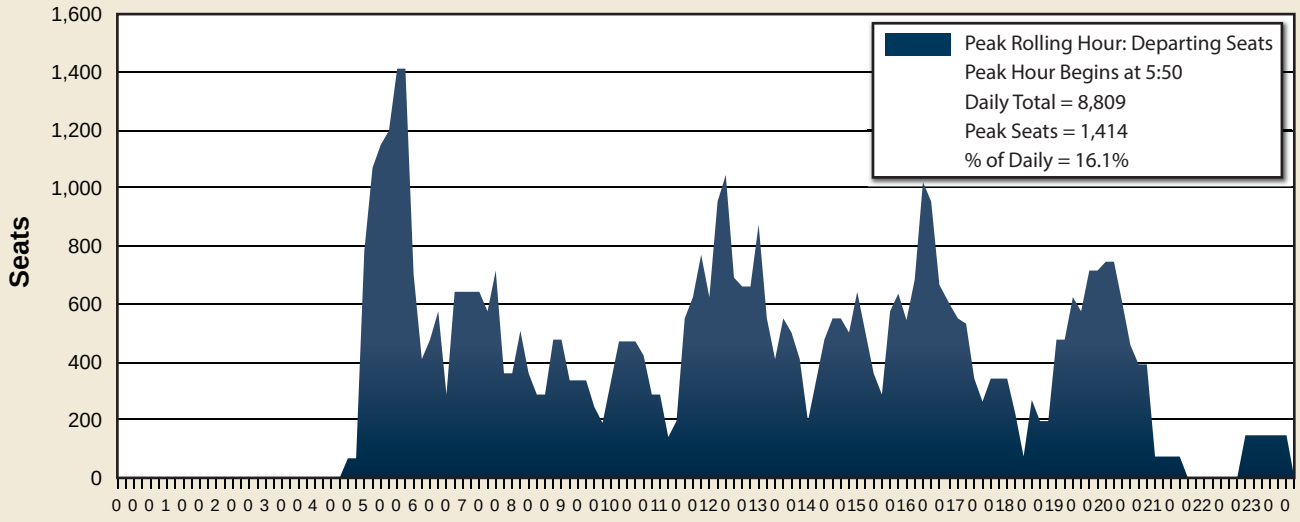
The arrival peak occurs late in the evening between 11:00 pm and 12:00 am. The departing peak occurs in the morning between 5:00 am and 6:00 am.

The total airline operations are known from tower and airport records. The peak month varies from year to year but has typically been in the summer months. As previously outlined in Table 2M, the forecast commercial operation level is derived by taking into consideration the future aircraft fleet mix. The peak month for airline operations has averaged 9.2 percent of annual airline operations. This factor is carried forward to estimate the future peak month for airline operations. The design day for airline operations is arrived at by dividing the annual airline operations by the number of days in the year. The ACRP model, utilizing the airline schedule, was also utilized to confirm the reasonableness of the current and forecast design day airline operations estimates. The design hour for airline operations is derived from the flight schedules.

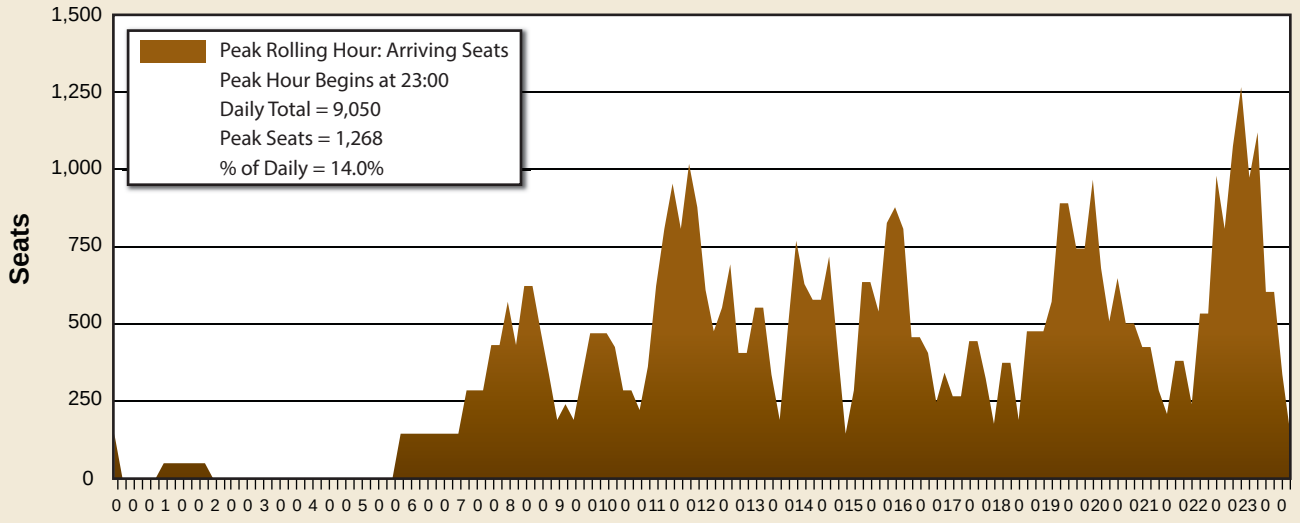
GENERAL AVIATION PEAKING CHARACTERISTICS

The peak month for general aviation operations at the Sunport has averaged 9.9 percent of yearly general aviation operations since 2007. The peak month for general aviation operations at the Sunport typically occurs during one of the summer months. The design day for general aviation operations are derived by dividing the peak month by the number of days in the month. For general aviation operations the peak month has typically been one with 30 days.

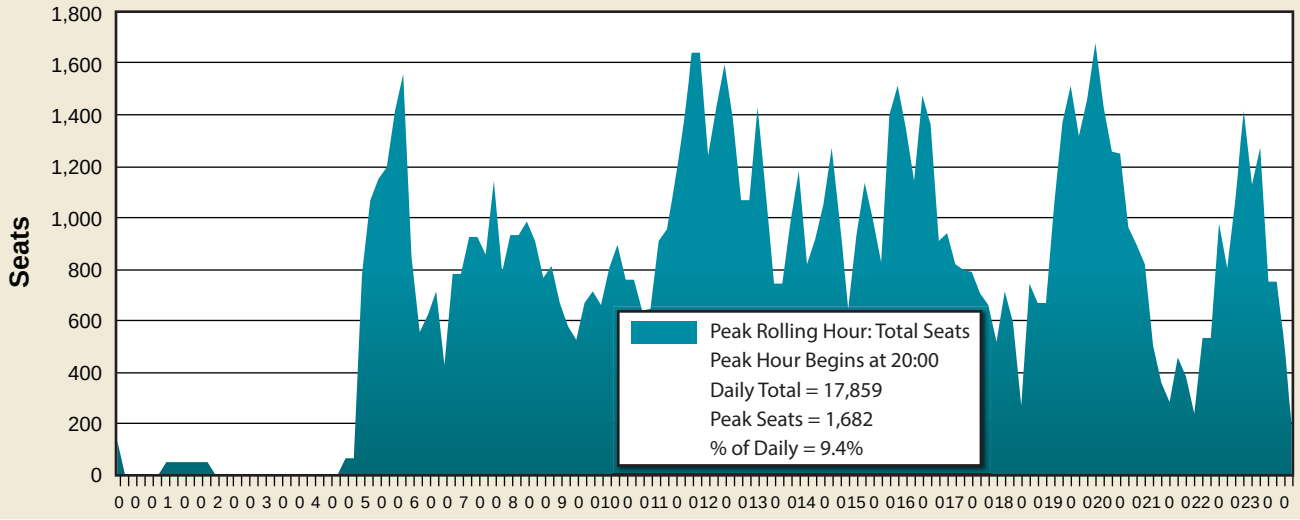
DESIGN DAY DEPARTING SEATS ROLLING 60 MINUTE PERIODS



DESIGN DAY ARRIVING SEATS ROLLING 60 MINUTE PERIODS



DESIGN DAY TOTAL SEATS (DEPARTING AND ARRIVING) ROLLING 60 MINUTE PERIODS



The tower provided hourly operations for the peak month (June) of the base year (2014). The peak day of each week was identified and the peak hour of each of those days was identified. The average peak hour is 9.4 percent of total operations for the average day of the week. Design hour general aviation operations are estimated as 9.4 percent of total operations for the day.

TOTAL OPERATIONS PEAKING CHARACTERISTICS

The total operations peak periods are utilized in examining the capacity of the airfield. The peak month of total operations has averaged 9.0 percent of annual operations since 2007, and it typically occurs during the summer months. The busy day was calculated by averaging the four busiest days in each week of the peak month. This represents 17.6 percent of peak month operations.

AIRFIELD CAPACITY

Airfield capacity is measured in a variety of different ways. The **hourly capacity** measures the maximum number of aircraft operations that can take place in an hour. The **annual service volume (ASV)** is an annual level of service that may be used to define airfield capacity needs. **Aircraft delay** is the total delay incurred by aircraft using the airfield during a given timeframe. FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*, provides a methodology for examining the operational capacity of an airfield for planning purposes. This analysis considers specific factors about the airfield. These various factors are depicted in **Exhibit 4B**. The following describes the input factors as they relate to the Sunport:

Runway Configuration – The Sunport has three runways configured with the primary Runway 8-26, a secondary Runway 3-21, and an additional crosswind Runway 12-30. Each runway is served by either a full-length or partial parallel taxiway. Runways 8 and 3 are equipped with an instrument landing system (ILS) for minimums down to 200 feet and ½ mile. Runways 3-21 and 8-26 also have GPS based RNAV (area navigation) and RNP (required navigation performance) instrument approaches. Runway 12-30 has no direct instrument approaches.

Runway Use – Runway usage is affected by several factors. Safe operations are the highest priority, so the runway's ability to accommodate a variety of aircraft is first and foremost. For example, at 6,000 feet in length, Runway 12-30 will not be as capable of accommodating the full variety of aircraft that operate at the Sunport. Wind direction is another operational factor for runway selection. The location of the runway in proximity to users and the ability to use runways simultaneously can also be a factor into runway use. During active periods when delay can be a factor, air traffic control will operate runway combinations that can safely provide adequate capacity to minimize delays. **Exhibit 4C** presents the various runway use scenarios, their hourly capacities, and likely percentage use based upon wind conditions and maximizing capacity.

Exit Taxiways - Based upon the aircraft mix using the Sunport, taxiways located between 3,500 and 6,500 feet from the landing threshold count in the exit rating for the airfield. Runway 26 has

AIRFIELD LAYOUT

Runway Configuration

Runway Use

Number of Exits

WEATHER CONDITIONS

VMC
Visual Meteorological Conditions

IMC
Instrument Meteorological Conditions

PVC
Poor Visibility Conditions

AIRCRAFT MIX

Category A & B Aircraft

Category C Aircraft

Category D Aircraft

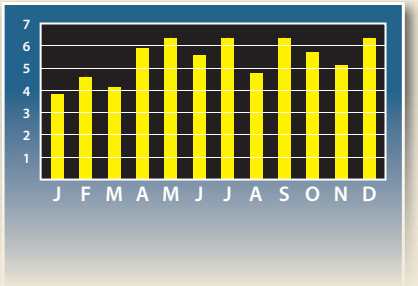
OPERATIONS

Arrivals

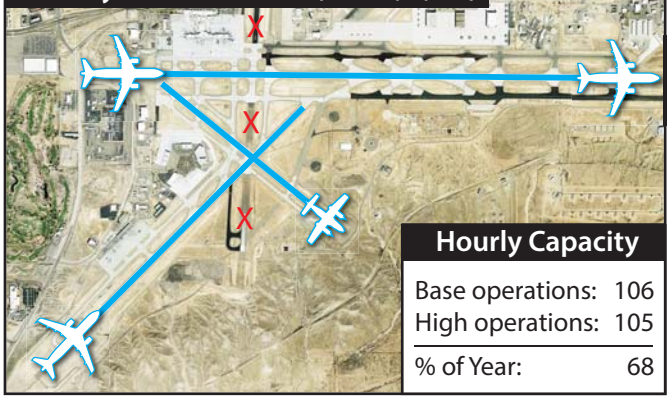
Departures

Touch-and-Go Operations

Total Annual Operations

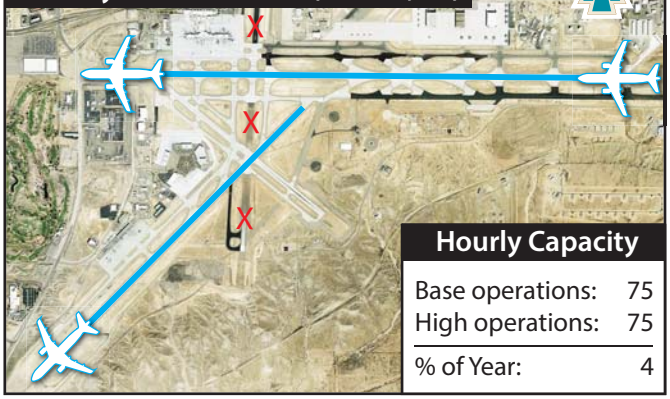


Runway Use Scenario A (VFR 8, 3, 12)



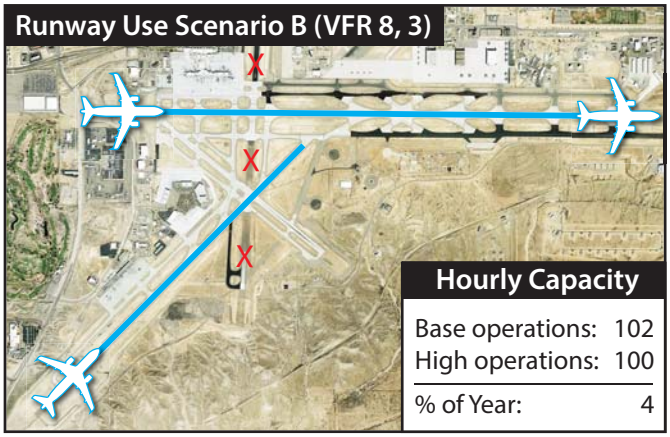
Hourly Capacity	
Base operations:	106
High operations:	105
% of Year:	68

Runway Use Scenario E (VFR 26, 21)



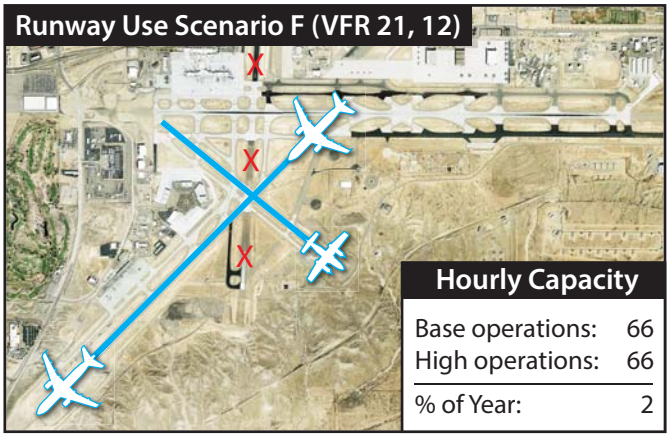
Hourly Capacity	
Base operations:	75
High operations:	75
% of Year:	4

Runway Use Scenario B (VFR 8, 3)



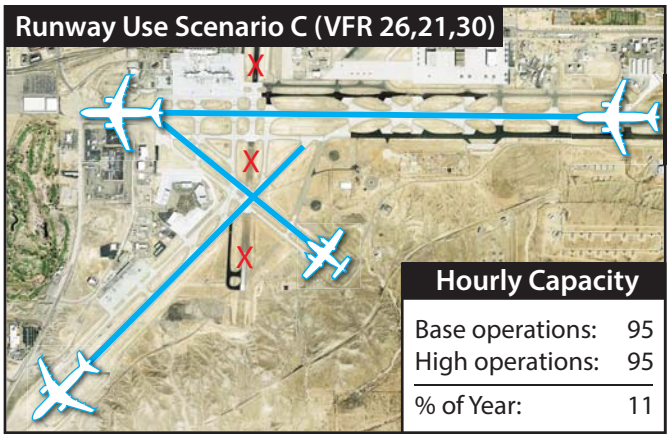
Hourly Capacity	
Base operations:	102
High operations:	100
% of Year:	4

Runway Use Scenario F (VFR 21, 12)



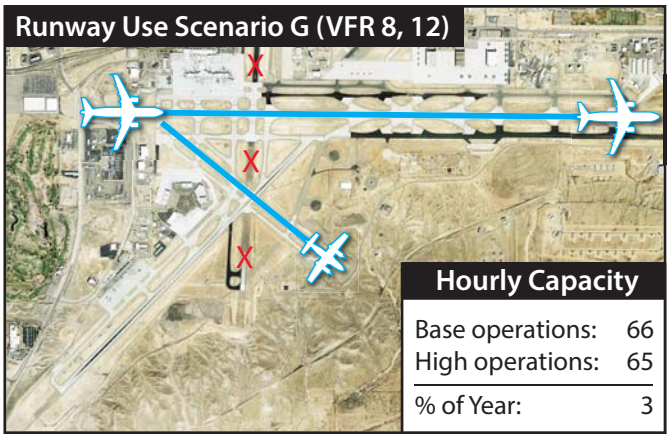
Hourly Capacity	
Base operations:	66
High operations:	66
% of Year:	2

Runway Use Scenario C (VFR 26,21,30)



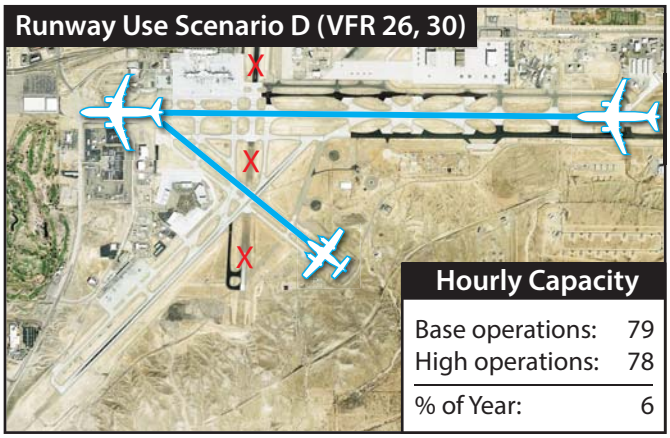
Hourly Capacity	
Base operations:	95
High operations:	95
% of Year:	11

Runway Use Scenario G (VFR 8, 12)



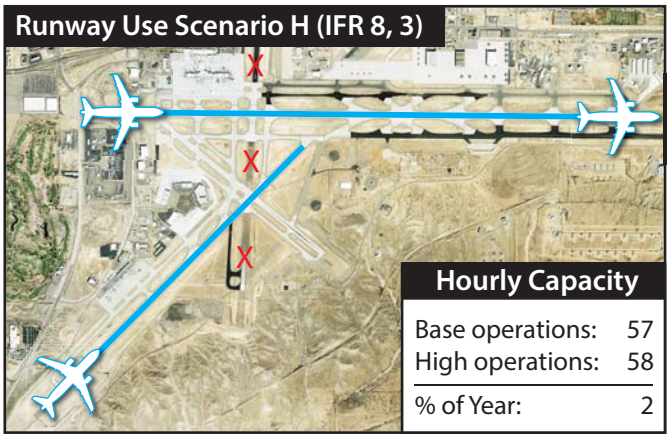
Hourly Capacity	
Base operations:	66
High operations:	65
% of Year:	3

Runway Use Scenario D (VFR 26, 30)



Hourly Capacity	
Base operations:	79
High operations:	78
% of Year:	6

Runway Use Scenario H (IFR 8, 3)



Hourly Capacity	
Base operations:	57
High operations:	58
% of Year:	2

three runway exits within the range for an exit rating of three. Each of the other runways has an exit rating of two.

Weather Conditions – Visual meteorological conditions (VMC) are defined as conditions when cloud ceilings are 1,000 feet or above and/or visibility is at least three statute miles. Instrument meteorological conditions (IMC) occur when cloud ceilings are between 500 and 1,000 feet and visibility is between one and three statute miles. Poor visibility conditions (PVC) apply for minimums below 500 feet and one mile.

Weather data indicates that the Sunport is in VMC approximately 98 percent of the year, IMC approximately one percent of the year, and PVC another one percent of the year.

Aircraft Mix - Descriptions of the classifications and the percentage mix for 2014 and a high range planning horizon are presented in **Table 4C**. The high range is based upon enplanement and operational levels approximately 15 percent above the long-term planning horizon.

TABLE 4C
Aircraft Operational Mix – Capacity Analysis
Albuquerque International Sunport

Aircraft Classification	Base Year-2014	High-Range
VMC – Visual Meteorological Conditions		
Classes A & B	39%	37%
Class C	57%	59%
Class D	4%	4%
IMC – Instrument Meteorological Conditions		
Classes A & B	22%	20%
Class C	73%	75%
Class D	5%	5%
Touch-and-Go's	4%	4%

Definitions:
Class A: Small single-engine aircraft with gross weight of 12,500 pounds or less.
Class B: Small twin-engine aircraft with gross weight of 12,500 pounds or less.
Class C: Large aircraft with gross weights over 12,500 pounds up to 300,000 pounds.
Class D: Large aircraft with gross weights over 300,000 pounds.

Percent Arrivals - Generally follows the typical 50-50 percent split.
Touch-and-Go Activity - Percentages of touch-and-go activity are presented in **Table 4C**.
Operational Levels - Operational planning horizons were outlined in the previous section of this chapter. The peak month averages approximately 9.0 percent of the year. The design hour averages approximately 7.9 percent of the operations in a day.

HOURLY RUNWAY CAPACITY

Based upon the input factors, current and future hourly capacities for the various operational scenarios at the Sunport were determined. The base year and high range hourly capacities are depicted in **Table 4D**. The base year weighted hourly capacity was 81.9 operations. This capacity is expected to decline slightly to 81.4 operations by the high range horizon as the mix of larger commercial and business jet aircraft at the Sunport is expected to increase over time. Forecast hourly demand will reach 49 percent of weighted hourly capacity by the high range horizon.

TABLE 4D
Airfield Demand/Capacity Summary
Albuquerque International Sunport

	PLANNING HORIZON	
	Base Year-2014	High-Range
Operational Demand		
Annual	130,069	175,800
Design Hour	31	35
Capacity		
Annual Service Volume	342,000	356,000
Weighted Hourly Capacity	81.9	81.4
Demand/Capacity Ratio	38.00%	49.40%
Delay		
Per Operation (Minutes)	0.3	0.5
Total Annual (Hours)	650	1,465

ANNUAL SERVICE VOLUME

The weighted hourly capacity is utilized to determine the annual service volume in the following equation:

Annual Service Volume (ASV) = C x D x H
C = weighted hourly capacity
D = ratio of annual demand to the average daily demand during the peak month
H = ratio of average daily demand to the design hour demand during the peak month

The ratio of annual demand to average daily demand (D) at the Sunport was determined to remain relatively constant in the future between 329 and 344. The ratio of average daily demand to average peak hour demand (H) was determined to be 12.7 in 2014. This ratio will also remain relatively constant over the forecast period.

The base year ASV was determined to be 342,000 operations. Changes in the demand ratios result in a slight increase in ASV to 356,000 at the high range.

Annual operations for the high range planning horizon are 175,800, which would be 49.4 percent of the Sunport's ASV. **Exhibit 4D** summarizes and compares the Sunport's ASV and the projected annual operations over the planning horizons.

AIRCRAFT DELAY

As the number of annual aircraft operations approaches the airfield's capacity, increasing amounts of delay to aircraft operations begin to occur. Delays occur to arriving and departing aircraft in all weather conditions. Arriving aircraft delays result in aircraft holding outside of the airport traffic area. Departing aircraft delays result in aircraft holding at the runway end until released by air traffic control.

Table 4D summarizes the aircraft delay analysis conducted for the Sunport. The delay per operation represents an average delay per aircraft. It should be noted that delays of five to ten times the average could be experienced by individual aircraft during peak periods. In the Base Year of 2014, total annual aircraft delay was 650 hours. As an airport's operations increase toward the annual service volume, delay increases exponentially. Analysis of delay factors for the high range planning horizon indicates that annual delay can be expected to exceed 1,465 hours. Delays are not considered significant below 20,000 hours.

CAPACITY ANALYSIS CONCLUSIONS

Exhibit 4D compares annual service volume to existing and forecast operational levels at Albuquerque International Sunport. The 2014 operations level equated to 38 percent of the airfield's annual service volume. Even at the high range planning horizon, total annual operations are expected to represent only 49 percent of the annual service volume.

FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems* (NPIAS), indicates that improvements for airfield capacity purposes should begin to be considered once operations reach 60 to 75 percent of the annual service volume. Since this range is not anticipated to be reached at the Sunport with even the high range activity, major capacity improvements such as new runways should not be considered necessary over the course of the planning horizons.

The 2014 operations level equated to 38 percent of the airfield's annual service volume.

AIRFIELD REQUIREMENTS

As indicated earlier, airport facilities include both airfield and landside components. Airfield facilities include those facilities that are related to the arrival, departure, and ground movement of aircraft. The FAA has established various dimensional design standards related to the airfield to ensure the safe operations of aircraft. **Exhibit 4E** presents these dimensional standards.

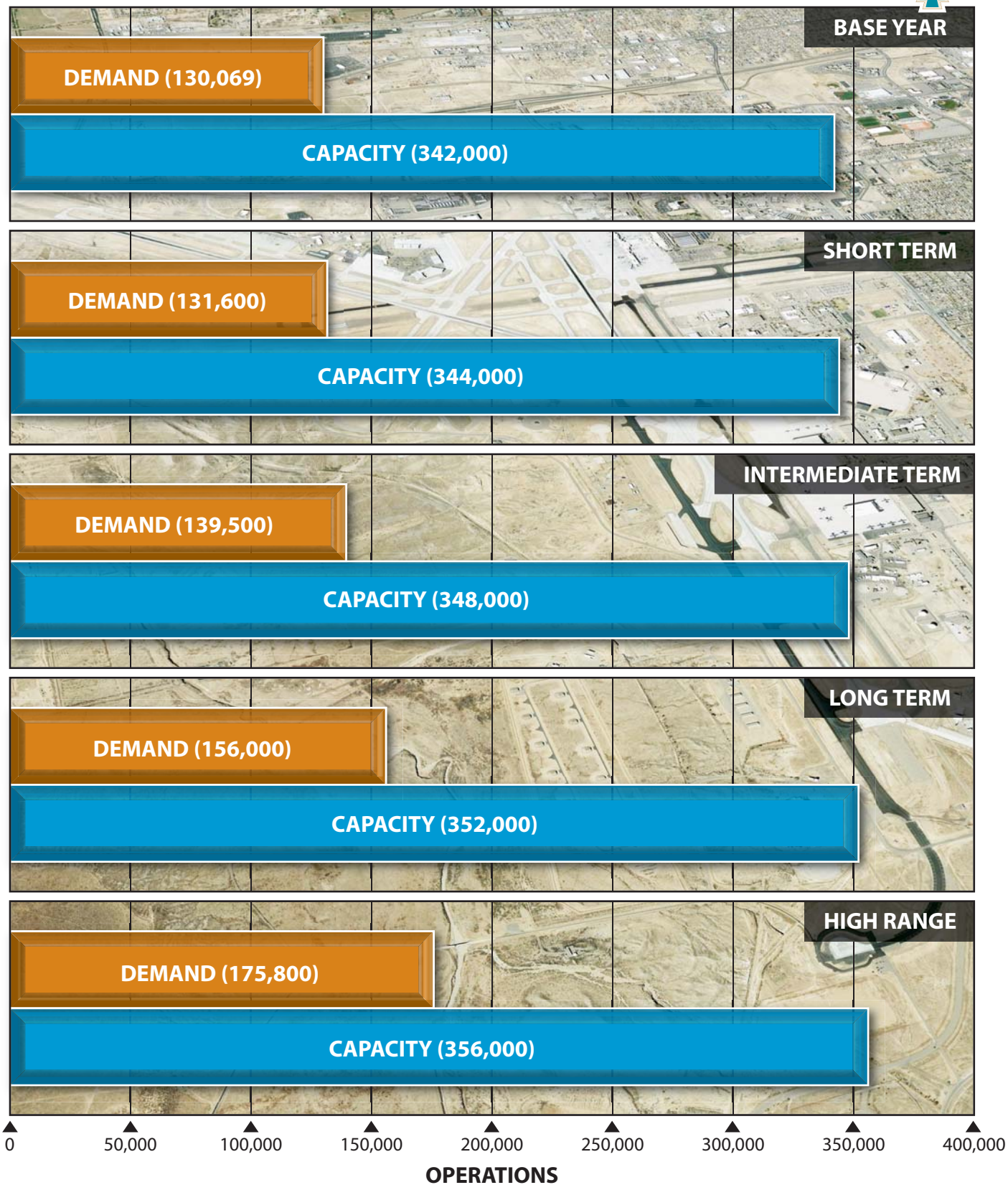
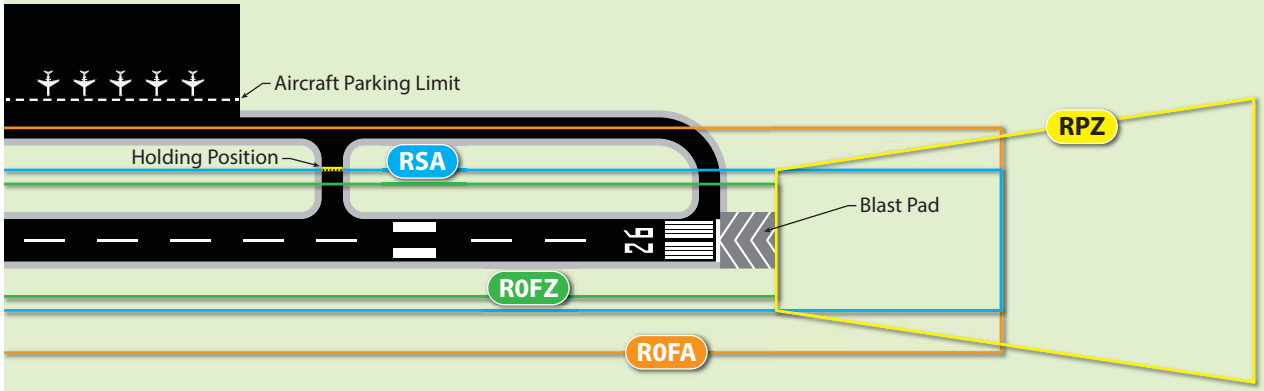


Exhibit 4D
AIRFIELD DEMAND VS. CAPACITY

	Runway 8-26		Runway 3-21		Runway 12-30
Runway Design Code (RDC)	D-IV-1600		D-IV-2400		B-III-VIS
Visibility Minimums (in miles)	3/8-mile (8)	1¼-mile (26)	½-mile (3)	1½-mile (21)	VIS
Existing Runway Dimensions	13,973 x 150		10,000 x 150		6,000 x 150
RUNWAY DESIGN STANDARDS					
Runway Width	150		150		100
Runway Shoulder Width	25		25		20
Blast Pad Length/Width	200 x 200		200 x 200		200 x 140
RUNWAY PROTECTION STANDARDS					
Runway Safety Area (RSA)					
Width	500		500		300
Length Beyond Departure End	1,000		1,000		600
Length Prior to Threshold	600		600		600
Runway Object Free Area (ROFA)					
Width	800		800		800
Length Beyond Departure End	1,000		1,000		600
Length Prior to Threshold	600		600		600
Runway Obstacle Free Zone (ROFZ)					
Width	400		400		400
Length Beyond Runway End	200		200		200
Precision Obstacle Free Zone (POFZ)	**Rwy 8**	**Rwy 26**	**Rwy 3**	**Rwy 21**	
Width	800	NA	800	NA	NA
Length Beyond Runway End	200	NA	200	NA	NA
Approach Runway Protection Zone	**Rwy 8**	**Rwy 26**	**Rwy 3**	**Rwy 21**	
Length	2,500	1,700	2,500	1,700	1,000
Inner Width	1,000	500	1,000	500	500
Outer Width	1,750	1,010	1,750	1,010	700
Departure Runway Protection Zone					
Length	1,700		1,700		1,000
Inner Width	500		500		500
Outer Width	1,010		1,010		700
RUNWAY SEPARATION STANDARDS					
Runway Centerline to:					
Holding Position	250		250		200
Parallel Taxiway	400		400		300
Aircraft Parking Area	500		500		400

Note: All dimensions in feet unless otherwide noted
Source: *FAA AC150/5300-13A, Airport Design*

Example of D-IV Design Standards



The FAA design standards impact the design of each of the airfield components to be analyzed. The following airfield components are analyzed in detail for compliance to FAA design standards:

- Runway Configuration
- Runway Design Standards
- Runways
- Taxiways
- Navigational and Weather Aids

RUNWAY CONFIGURATION

The Sunport's airfield system has three runways. Primary Runway 8-26 is oriented in an east to west manner. Crosswind Runway 3-21 is oriented in a southwest to northeast manner, and crosswind Runway 12-30 is oriented from the northwest to the southeast. All runways can support commercial operations; however, Runway 12-30 primarily serves general aviation activity due to its length and strength. The two crosswind runways cross each other, and no runways cross the primary runway.

A crosswind runway configuration is very common and is in place at several commercial service airports across the country. A crosswind configuration is generally required to meet local wind conditions as detailed below. For the operational safety and efficiency of an airport, it is desirable for the primary runway to be oriented as close as possible to the direction of the prevailing wind. This reduces the impact of wind components perpendicular to the direction of travel of an aircraft that is landing or taking off.

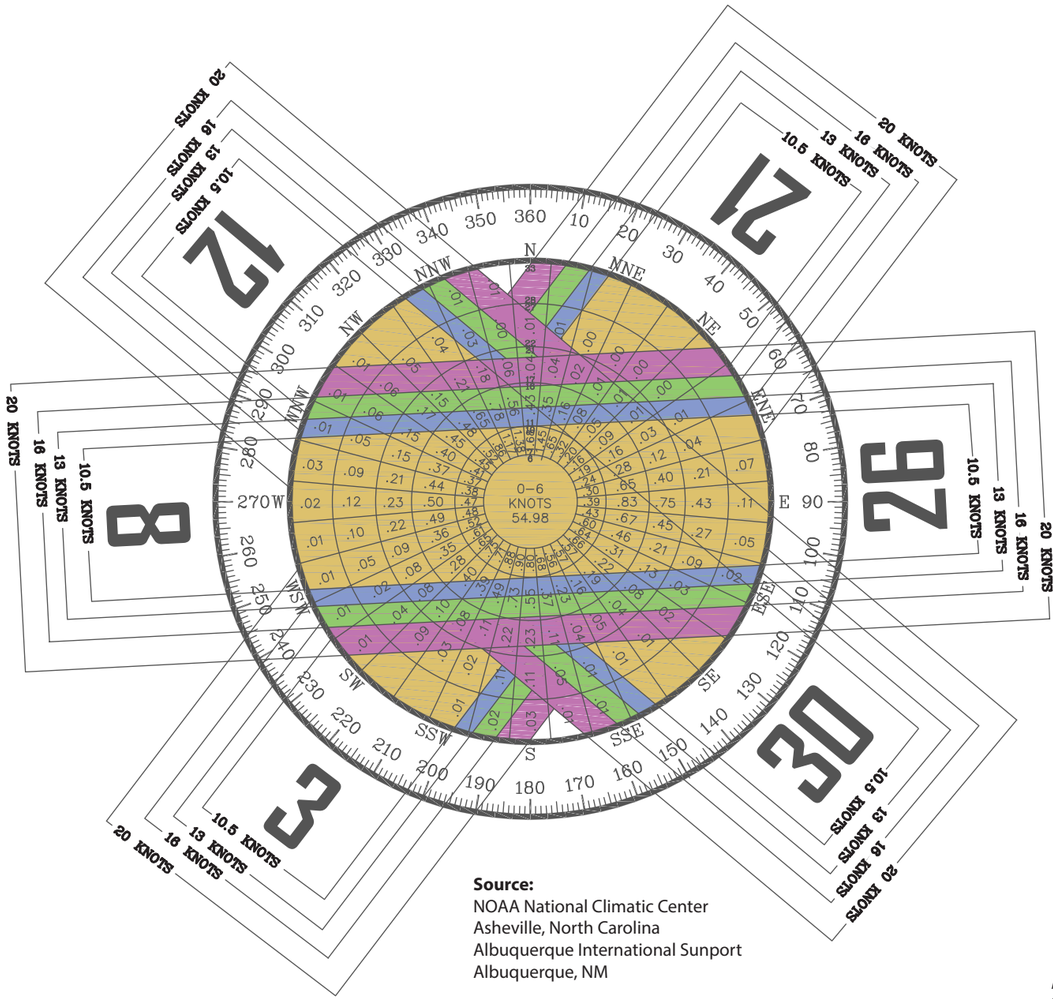
FAA AC 150/5300-13A, *Airport Design,* recommends that a crosswind runway be made available when the primary runway orientation provides for less than 95 percent wind coverage for specific crosswind components. The 95 percent wind coverage is computed on the basis of not exceeding a 10.5 knot (12 mph) component for runway design code (RDC) A-I and B-I, 13 knot (15 mph) component for RDC A-II and B-II, 16 knot (18 mph) component for RDC A-III, B-III, C-I through C-III, and D-I through D-III, and 20 knots for larger wingspans.

Weather data specific to the Sunport was obtained from the National Oceanic Atmospheric Administration (NOAA) National Climatic Data Center. This data was collected from the Sunport weather reporting station over a continuous period from November 2004 through October 2014. A total of 110,099 observations of wind direction and intensity as well as other weather observations were made. Of the total number of observations, 2,081 were made in Instrument Flight Rule (IFR) conditions. IFR conditions exist when visibility is below three miles, or the cloud ceilings are below 1,000 feet.

Exhibit 4F presents both an all-weather and IFR wind rose. A wind rose is a graphic tool that gives a succinct view of how wind speed and direction are historically distributed at a particular location. The table at the top of the wind roses indicates the percent of wind coverage for each runway at specific wind intensity.

ALL WEATHER WIND COVERAGE

Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 8–26	*90.79%*	*94.30%*	*97.74%*	*99.18%*
Runway 3–21	*86.88%*	*91.73%*	*96.17%*	*98.71%*
Runway 12–30	*89.71%*	*94.06%*	*97.52%*	*99.16%*
Combined 8–26/3–21	*94.87%*	*97.52%*	*99.10%*	*99.79%*
Combined 8–26/12–30	*95.41%*	*97.65%*	*99.04%*	*99.69%*
All Runways	*98.48%*	*99.39%*	*99.78%*	*99.95%*



Source:
NOAA National Climatic Center
Asheville, North Carolina
Albuquerque International Sunport
Albuquerque, NM

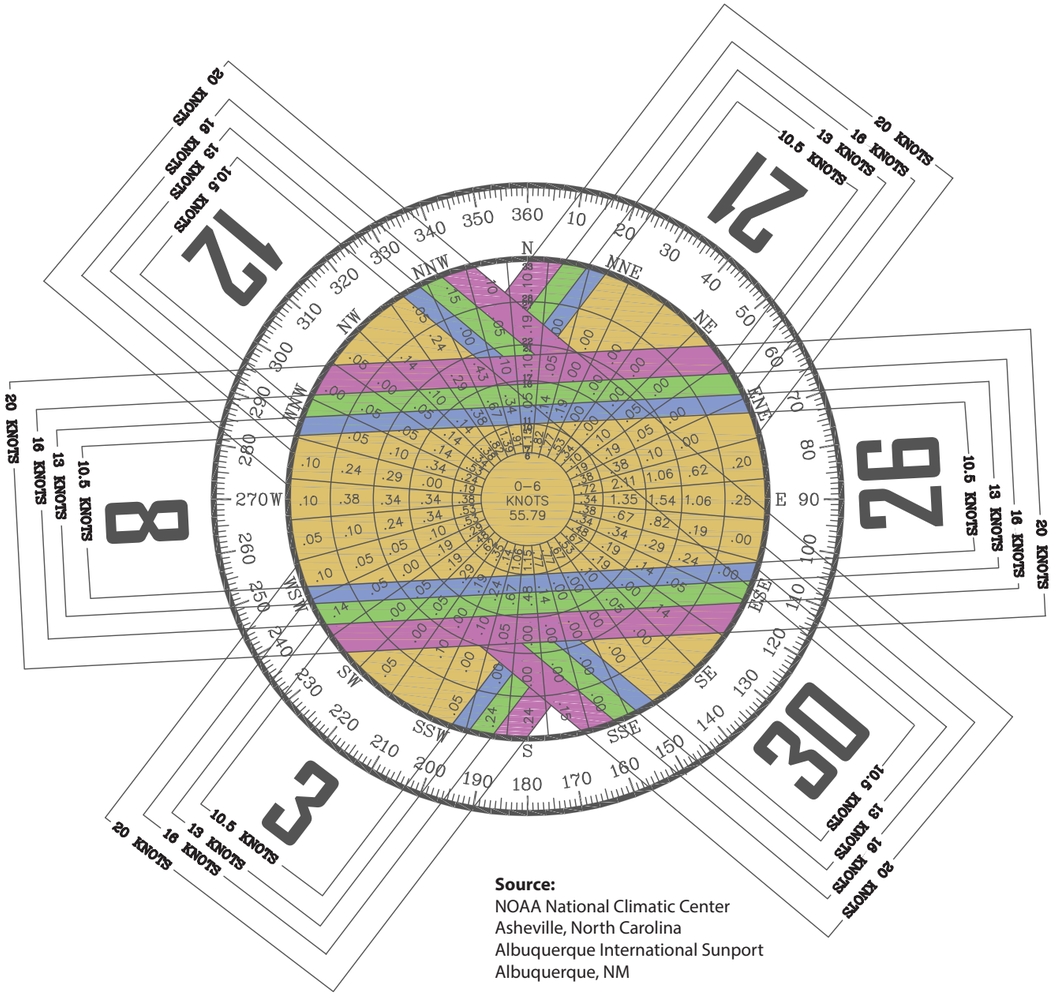
Observations:
110,099 All Weather Observations
November 2004-October 2014

NORTH

Magnetic Declination
8° 50' East (Nov. 2014)
Annual Rate of Change
00° 7.0' West (Nov. 2014)

IFR WIND COVERAGE

Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 8–26	*92.46%*	*94.55%*	*96.88%*	*98.19%*
Runway 3–21	*84.86%*	*89.04%*	*93.52%*	*97.09%*
Runway 12–30	*86.83%*	*91.89%*	*95.85%*	*97.95%*
All Runways	*97.95%*	*98.61%*	*98.90%*	*99.32%*



Source:
NOAA National Climatic Center
Asheville, North Carolina
Albuquerque International Sunport
Albuquerque, NM

Observations:
2,081 IFR Weather Observations
November 2004-October 2014

This page intentionally left blank

As can be seen, no single runway can provide sufficient wind coverage at 13 knots or below. Therefore, a crosswind runway is justified by FAA standards. The combination of the primary Runway 8-26 and Runway 3-21 provides 95 percent coverage for all wind categories except at 10.5 knots, while the combination of primary Runway 8-26 and Runway 12-30 provides 95 percent coverage for all wind categories. However, Runway 12-30 is not capable of accommodating all the larger aircraft that need at least 12-knot wind coverage. Unless the capabilities of Runway 12-30 can be significantly improved, all three runways are necessary for adequate wind coverage.

RUNWAY DESIGN STANDARDS

The FAA has established several design standards to protect aircraft operational areas and keep them free from obstructions that could affect their safe operation. These include the runway safety area (RSA), runway object free area (ROFA), runway obstacle free zone (ROFZ), and runway protection zone (RPZ).

The entire RSA, ROFA, and ROFZ must be under the direct ownership of the airport sponsor to ensure these areas remain free of obstacles and can be readily accessed by maintenance and emergency personnel. The RPZ for each runway end should also be under airport ownership. An alternative to outright ownership of the RPZ is the purchase of avigation easements (acquiring control of designated airspace within the RPZ) or having sufficient land use control measures in place which ensure the RPZ remains free of incompatible development. Dimensional standards for the various safety areas associated with the runways are a function of the type of aircraft expected to use the runways as well as the instrument approach capability. The various airport safety areas are shown on **Exhibit 4G** along with any deficiencies.

The FAA has established several design standards to protect aircraft operational areas and keep them free from obstructions that could affect their safe operation.

Runway Safety Area (RSA)

The RSA is defined in FAA Advisory Circular (AC) 150/5300-13A, *Airport Design,* as a "surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of undershoot, overshoot, or excursion from the runway." The RSA is centered on the runway and dimensioned in accordance to the approach speed of the critical design aircraft using the runway. The FAA requires the RSA to be cleared and graded, drained by grading or storm sewers, capable of accommodating the design aircraft and fire and rescue vehicles, and free of obstacles not fixed by navigational purpose such as runway edge lights or approach lights.

There are two locations where portions of the RSA extend beyond the Sunport property boundary. On the northeast end of Runway 26, approximately 1.6 acres of RSA land extends onto Kirtland Air Force Base (KAFB) property. On the southeast end of Runway 21, approximately 0.5 acres is on KAFB property, of which 0.4 acres is leased from KAFB. On the Runway 20 end, approximately 8.3 acres of the RSA extends onto KAFB property, the entirety of which is leased by the Sunport. Historically, it has been

acceptable to the FAA for the RSA to extend onto KAFB property since the airfield is joint use and is still secure for airport operations.

Runway Object Free Area (ROFA)

The ROFA is "a two-dimensional ground area surrounding runways, taxiways, and taxilanes, which is clear of objects except for objects whose location is fixed by function (i.e., airfield lighting)." The ROFA does not have to be graded and level like the RSA; instead, the primary requirement for the ROFA is that no object in the ROFA penetrates the lateral elevation of the RSA. The ROFA is centered on the runway, extending out in accordance to the critical design aircraft utilizing the runway.

There are two locations where the ROFA extends beyond the Sunport property boundary. On the north-east end of Runway 26, approximately 4.7 acres of ROFA land extends onto KAFB property. On the southeast end of Runway 21, approximately 2.5 acres is on KAFB property, of which 1.4 acres is leased from KAFB. On the Runway 20 end, approximately 26.6 acres of the ROFA extends onto KAFB property, the entirety of which is leased by the Sunport. Historically, it has been acceptable to the FAA for the ROFA to extend onto KAFB property since the airfield is joint use and is still secure for airport operations.

Runway Obstacle Free Zone (ROFZ)

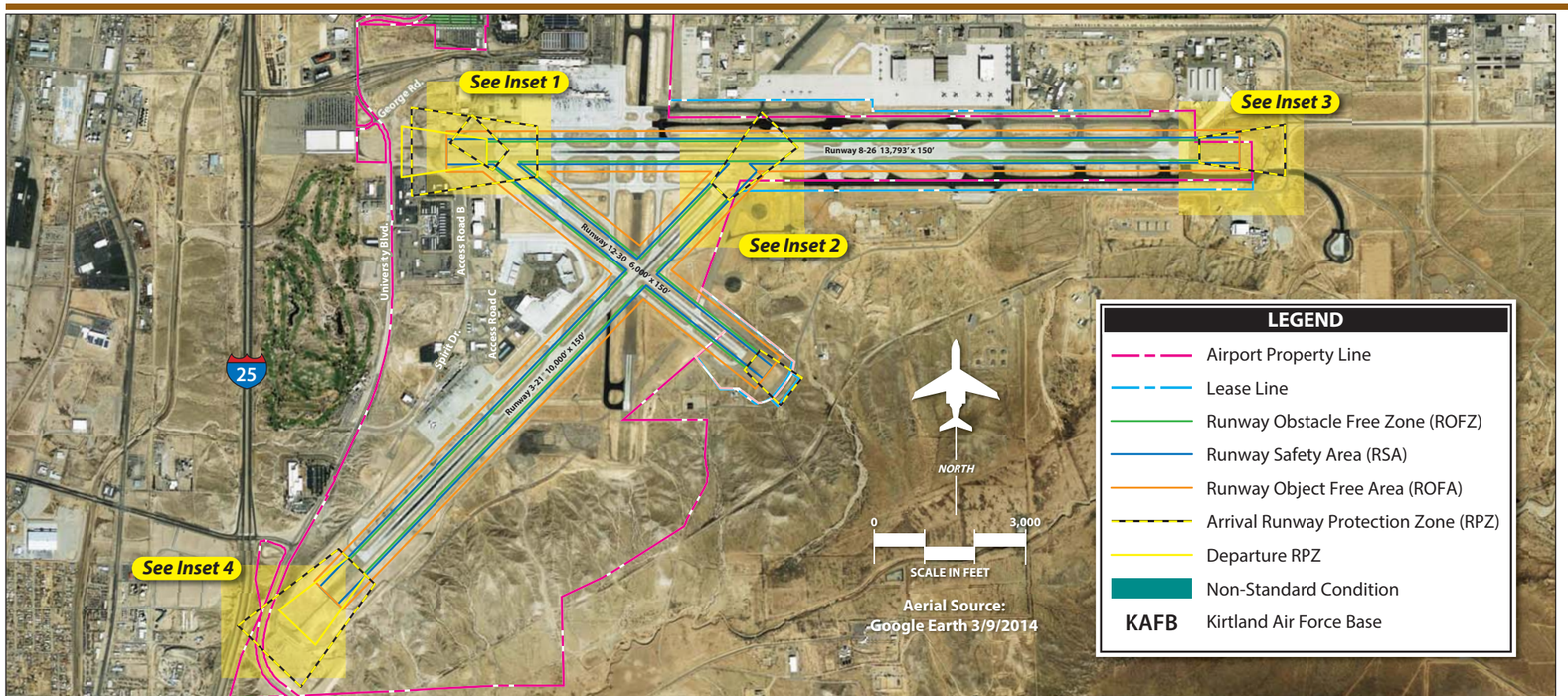
The ROFZ is an imaginary volume of airspace which precludes object penetrations, including taxiing and parked aircraft. The only allowance for ROFZ obstructions is navigational aids mounted on frangible bases which are fixed in their location by function, such as airfield signs. The ROFZ is established to ensure the safety of aircraft operations. If the ROFZ is obstructed, the airport's approaches could be removed, or approach minimums could be increased.

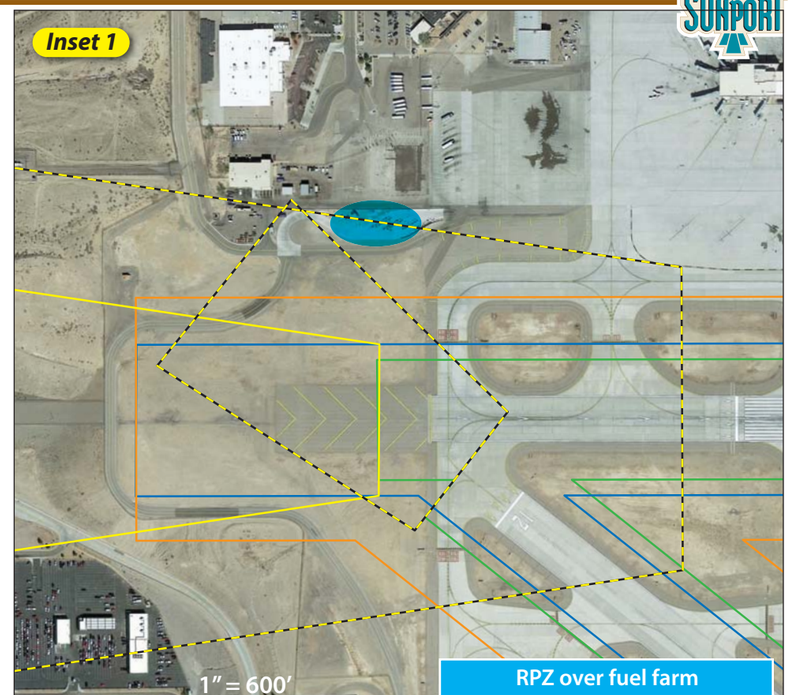
There is one location where the ROFZ extends slightly beyond the Sunport property boundary. On the northeast end of Runway 26, approximately 0.06 acres of ROFZ land extends onto KAFB property. On the Runway 20 end, approximately 7.8 acres of the ROFZ extends onto KAFB property, the entirety which is leased by the Sunport. Historically, it has been acceptable to the FAA for the ROFZ to extend onto KAFB property since the airfield is joint use and is still secure for airport operations.

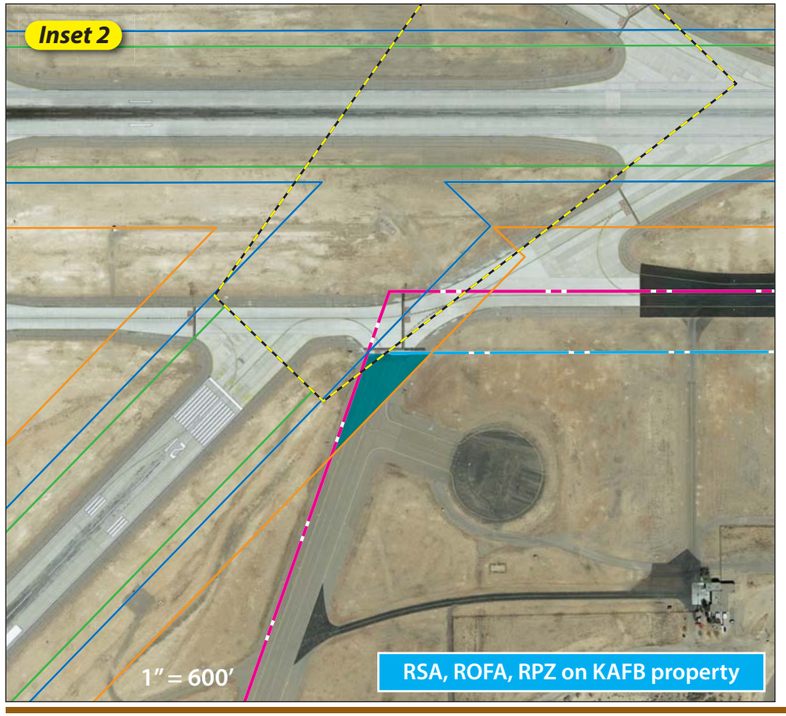
Precision Obstacle Free Zone (POFZ)

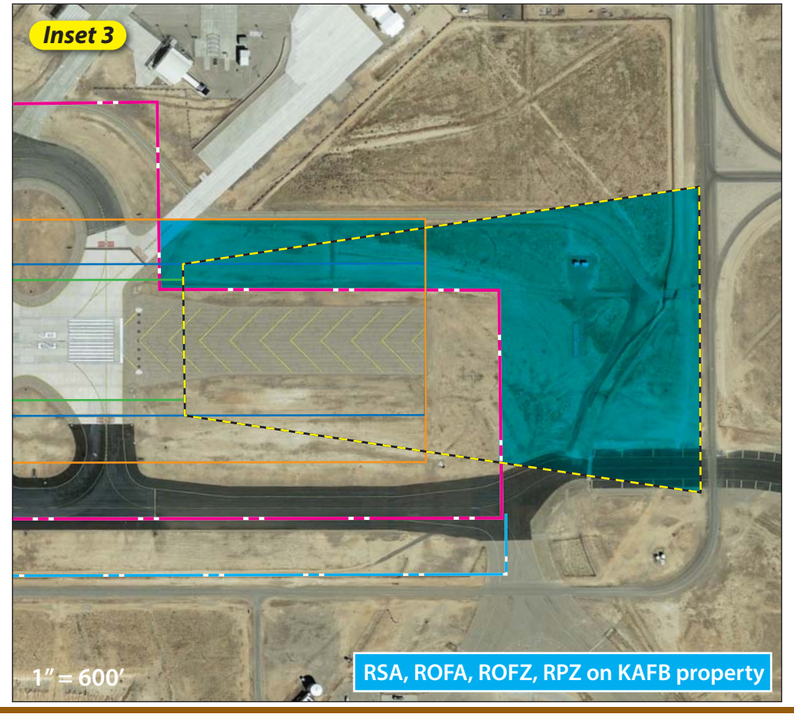
A precision obstacle free zone (POFZ) is defined for runway ends with a precision approach, such as the ILS approaches to Runways 8 and 3. The POFZ is 800 feet wide, centered on the runway, and extends behind the runway threshold 200 feet. The POFZ is in effect when the following conditions are met:

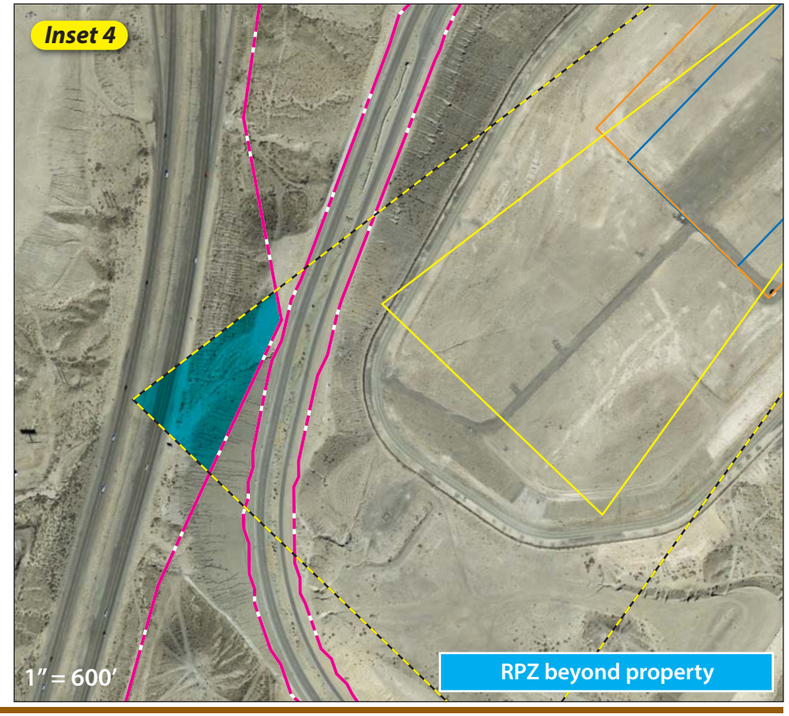
a) The runway supports a vertically guided approach.
b) Reported ceiling is below 250 feet and/or visibility is less than ¾-mile.
c) An aircraft is on final approach within two miles of the runway threshold.


See Inset 1
See Inset 2
See Inset 3
See Inset 4
George Rd.
University Blvd.
Access Road B
Access Road C
Sparta Dr.
25
Runway 8-26 13,793' x 150'
Runway 12-30 6,040' x 150'
Runway 3-21 10,000' x 150'
NORTH
0
3,000
SCALE IN FEET
Aerial Source:
Google Earth 3/9/2014
LEGEND
Airport Property Line
Lease Line
Runway Obstacle Free Zone (ROFZ)
Runway Safety Area (RSA)
Runway Object Free Area (ROFA)
Arrival Runway Protection Zone (RPZ)
Departure RPZ
Non-Standard Condition
KAFB Kirtland Air Force Base


Inset 1
1" = 600'
RPZ over fuel farm


Inset 2
1" = 600'
RSA, ROFA, RPZ on KAFB property


Inset 3
1" = 600'
RSA, ROFA, ROFZ, RPZ on KAFB property


Inset 4
1" = 600'
RPZ beyond property

This page intentionally left blank

When the POFZ is in effect, a wing of an aircraft holding on a taxiway may penetrate the POFZ; however, neither the fuselage nor the tail may infringe on the POFZ. POFZ standards are met for Runways 8 and 3 at Albuquerque International Sunport. The POFZ for Runway 8 does extend over Taxiway A by approximately 15 feet. While the wings of taxiing aircraft may penetrate the POFZ in this location, neither the fuselage not the tail penetrates. The POFZ meets design standard.

Runway Protection Zones (RPZ)

The RPZ is a trapezoidal area centered on the runway, typically beginning 200 feet beyond the runway end. The RPZ has been established by the FAA to provide an area clear of obstructions and incompatible land uses, in order to enhance the protection of people and property on the ground. The RPZ is comprised of the central portion of the RPZ and the controlled activity area. The central portion of the RPZ extends from the beginning to the end of the RPZ, is centered on the runway, and is the width of the ROFA. The controlled activity area is any remaining portions of the RPZ. The dimensions of the RPZ vary according to the visibility minimums serving the runway and the type of aircraft (design aircraft) operating on the runway.

While the RPZ is intended to be clear of incompatible objects or land uses, some uses are permitted with conditions and other land uses are prohibited. According to AC 150/5300-13A, *Airport Design*, the following land uses are permissible within the RPZ:

- Farming that meets the minimum buffer requirements;
- Irrigation channels as long as they do not attract birds;
- Airport service roads, as long as they are not public roads and are directly controlled by the airport operator;
- Underground facilities, as long as they meet other design criteria, such as RSA requirements, as applicable; and
- Unstaffed navigational aids (NAVAIDs) and facilities, such as required for airport facilities that are fixed by function in regard to the RPZ.

Any other land uses considered within RPZ land owned by the airport sponsor must be evaluated and approved by the FAA Office of Airports. The FAA has published *Interim Guidance on Land Uses within a Runway Protection Zone* (9.27.2012), which identifies several potential land uses that must be evaluated and approved prior to implementation. The specific land uses requiring FAA evaluation and approval include:

- Buildings and structures (examples include, but are not limited to residences, schools, churches, hospitals or other medical care facilities, commercial/industrial buildings, etc.)
- Recreational land use (examples include, but are not limited to golf courses, sports fields, amusement parks, other places of public assembly, etc.)
- Transportation facilities. Examples include, but are not limited to:
    - Rail facilities - light or heavy, passenger or freight
    - Public roads/highways

    - Vehicular parking facilities
- Fuel storage facilities (above and below ground)
- Hazardous material storage (above and below ground)
- Wastewater treatment facilities
- Above-ground utility infrastructure (i.e., electrical substations), including any type of solar panel installations.

The *Interim Guidance on Land within a Runway Protection Zone* states, "RPZ land use compatibility also is often complicated by ownership considerations. Airport owner control over the RPZ land is emphasized to achieve the desired protection of people and property on the ground. Although the FAA recognizes that in certain situations the airport sponsor may not fully control land within the RPZ, the FAA expects airport sponsors to take all possible measures to protect against and remove or mitigate incompatible land uses."

Currently, the RPZ review standards are applicable to any new or modified RPZ. The following actions or events could alter the size of an RPZ, potentially introducing an incompatibility:

An airfield project (e.g., runway extension, runway shift),
A change in the critical design aircraft that increases the RPZ dimensions,
A new or revised instrument approach procedure that increases the size of the RPZ, and/or
A local development proposal in the RPZ (either new or reconfigured).

Since the Interim guidance only addresses new or modified RPZ, existing incompatibilities are generally (but not always) grandfathered. While it is still necessary for the airport sponsor to take all reasonable actions to meet the RPZ design standard, FAA funding priority for certain actions, such as relocating existing roads in the RPZ, will be determined on a case-by-case basis.

The Approach and Departure RPZ (overlapping the same space) on the Runway 26 end extend onto KAFB property. That portion beyond Sunport property is approximately 17.6 acres. Approximately 3.0 acres of the Approach RPZ on the Runway 3 end extends beyond Sunport property on the west side of University Boulevard. University Boulevard also crosses the Approach RPZ for Runway 3. The Approach and Departure RPZ (overlapping the same space) on the Runway 20 end is on KAFB property; however, the Sunport has a lease on this property. The Approach RPZ on the Runway 8 end crosses the tanker truck refueling station. Approximately 0.3 acres of the Approach and Departure RPZ (overlapping the same space) on the Runway 21 end extends beyond Sunport property; however, the Sunport leases this property.

It is recommended that the Sunport obtain easement rights over KAFB property where the RPZ extends onto their property. The Sunport should also plan to purchase the three acres of RPZ land on the west side of University Boulevard and within the Runway 3 RPZ. The tanker truck refueling station was constructed prior the publication of the *Interim Guidance on Land within a Runway Protection Zone* and it is also outside the central portion of the RPZ; therefore, it is likely a grandfathered RPZ incompatibility.

Runway/Taxiway Separation

The design standards for the separation between runways and parallel taxiways are a function of the critical design aircraft and the instrument approach visibility minimum. The runway to taxiway separation standard for RDC D-IV runways is 400 feet (centerline to centerline). Parallel Taxiways A, E, and F meet this standard.

Runway 12-30 has an RDC of B-III with visual approaches only. The standard taxiway separation is 300 feet. Taxiways G and J are parallel to Runway 12-30 and are separated from the runway by greater than 300 feet, thus meeting standard.

Hold Line Separation

Hold lines are markings on taxiways leading to runways. When instructed, pilots are to stop short of the hold line. For Runways 8-26 and 3-21, the hold lines are 250 feet from the runway centerlines. The hold lines are at a separation distance of 200 feet for Runway 12-30.

According to FAA AC 150/5300-13A, *Airport Design*, Change 1, the hold line location must be increased based on an airport's elevation and the RDC of the runway. For RDC C/D/E-III, IV, V, the hold line position should be increased one foot for every 100 feet above sea level. With the Sunport elevation at 5,355 feet, the hold lines for Runways 8-26 and 3-21 should be increased above 250 feet by 54 feet or at 304 feet from the runway centerline. For RDC A/B-III, the hold line distance from the runway centerline should be increased one foot for every 100 feet above 5,100 feet. Thus, the hold lines serving Runway 12-30 should be located 204 feet from the runway centerline.

Due to terrain and geometry constraints, the FAA has permitted the Sunport to maintain their hold lines at the standard 250-foot and 200-foot distance and has not implemented the increase based on elevation. In 2004, a Modification to Standards (MOS) was approved by the FAA which permits the hold lines for Runways 8-26 and 3-21 to remain in their current location because changing them "could result in insufficient ramp separation, and capacity issues." The duration of an MOS is no more than five years and they must be reviewed periodically, especially during planning studies such as this master plan. The MOS for hold line separation will be reviewed in the alternatives chapter.

Aircraft Parking Area Separation

For Runways 8-26 and 3-31, aircraft parking areas should be at least 500 from the runway centerline. For Runway 12-30, aircraft parking areas should be at least 400 feet from the runway centerline. All aircraft parking areas meet this standard.

RUNWAYS

The adequacy of the existing runway system at Albuquerque International Sunport has been analyzed from several perspectives, including runway orientation and adherence to safety area standards. From

this information, requirements for runway improvements were determined for the Sunport. Runway elements, such as length, width, and strength, are now presented.

Runway Length

The determination of runway length requirements for an airport is based on five primary factors:

- Mean maximum temperature of the hottest month,
- Airport elevation,
- Runway gradient,
- Critical aircraft type expected to use the runway, and
- Stage length of the longest nonstop destination (specific to larger aircraft).

Aircraft performance declines as elevation, temperature, and runway gradient factors increase. For the Sunport, the mean maximum daily temperature of the hottest month is 90.1 degrees Fahrenheit (F), which occurs in July. The airport elevation is 5,354.9 feet above mean sea level (MSL). The runway end elevation difference is 43 feet for Runway 8-26, 11 feet for Runway 3-21, and one foot for Runway 12-30. The gradient of the runways conforms to FAA design standards.

Runway length needs for commercial aircraft must factor the conditions described above and the load carried. The aircraft load is dependent upon the payload of passengers and/or cargo, plus the amount of fuel it has on board. For departures, the amount of fuel varies depending upon the length of non-stop flight or trip length. **Table 4E** shows the current and potential destinations of greater than 1,000 miles. The longest current non-stop flight is to New York (JFK), which is 1,820 miles. The longest potential domestic destination is Boston, which is one of the top 20 destinations from the Sunport (ranking 14th in 2014), at 1,968 miles.

TABLE 4E
Non-Stop Haul Lengths Over 1,000 Miles
Albuquerque International Sunport

Existing Daily Non-stops	Air Miles (Great Circle)
New York (JFK)	1,820
Baltimore (BWI)	1,665
Orlando (MCO)	1,549
Charlotte (CLT)	1,445
Atlanta (ATL)	1,266
Seattle (SEA)	1,178
Chicago (MDW)	1,118
Portland (PDX)	1,110
Potential Non-stops	
Boston (BOS)	1,968
Detroit (DET)	1,364
Potential International Non-stops	
Montreal (YUL)	1,872
Toronto (YYZ)	1,565
Mexico City (MEX)	1,169

Source: http://www.landings.com/_landings/pages/search/search_dist_apt.html

FAA AC 150/5325-4C, *Runway Length Recommendations for Airport Design,* indicates that individual aircraft planning manuals should be consulted when analyzing runway length for aircraft over 12,500 pounds. The aircraft planning manuals for the most common commercial aircraft currently or potentially using the Sunport were consulted to determine minimum runway length needs. The runway length needs were determined for travel distances of 1,000, 1,500, and 2,000 miles, which includes most current or potential domestic destinations as well as many potential international destinations. The analysis assumed a full passenger load and adequate fuel (including reserve) to reach the destination. In some cases, airlines will ferry fuel due to availability/pricing; however, fuel ferrying is not considered in the analysis. **Table 4F** presents the runway length requirements for the most common commercial aircraft currently or potentially using the Sunport.

TABLE 4F
Takeoff Length Requirements (Commercial)
Albuquerque International Sunport

Aircraft	1,000 mi.	1,500 mi.	2,000 mi.
Narrow Body Aircraft			
B737-8	7,900	8,300	9,500
B757-2	5,800	6,800	7,100
A320-2	7,100	8,000	8,700
MD-83	8,700	9,500	NA
MD-88	8,700	10,000	NA
Wide Body Aircraft			
A300	6,800	7,500	8,500
A310	5,800	6,300	7,000
B767-4	8,300	9,000	9,600
B747-4	6,700	7,200	7,700
B747-8	6,200	6,300	6,500
B787-8	8,600	8,800	9,200
B777-3	10,400	11,600	13,300
DC-10-30	8,300	9,000	9,800

NA: Fully loaded aircraft restricted at this elevation and distance.
Source: Aircraft operational manuals.

Runway 8-26 Length

Runway 8-26 is 13,793 feet long, which is sufficient to meet the needs of current and future commercial service aircraft operating domestically or to neighboring international destinations. In addition, the length allows the runways to serve nearly all U.S. military aircraft that may be associated with KAFB.

The landing threshold for Runway 8 is displaced by 1,000 feet, which has the effect of limiting landing distance to 12,793 feet. Since landing length needs are typically less than takeoff length needs, the shorter landing distance available is acceptable to serve airport operations. Therefore, no consideration is given to relocating the landing threshold to the pavement end as it is unnecessary. In addition, relocating the landing threshold would require relocation of a portion of the MALSR approach lighting system which is currently imbedded in the first 1,000 feet of runway. Additionally, it would lower the aircraft approach slope, potentially impacting the population below the approach path.

Runway 8-26 is 13,793 feet long, which is sufficient to meet the needs of current and future commercial service aircraft operating domestically or to neighboring international destinations.

Runway 3-21 Length

Providing a safe alternative for air carrier and business jet aircraft operations during times when the primary runway is not available is essential. It is not uncommon for the primary runway to be closed due to normal maintenance, runway rehabilitation, snow removal, and extreme wind conditions. Ideally,

the crosswind runway serving commercial and business jet activity would be the same length as the primary runway. At a minimum, the commercial crosswind runway should be capable of accommodating the vast majority of operations; therefore, a length that is approximately 90 percent of the primary runway length should be considered.

Previous planning efforts and the current Airport Layout Plan (ALP) for the Sunport show the potential extension of Runway 3-21 to 11,000 feet in length. It is considered prudent to maintain this option in the long-term plans for the Sunport.

The current Airport Layout Plan (ALP) for the Sunport shows the potential extension of Runway 3-21 to 11,000 feet in length.

Runway 12-30 Length

Runway 12-30 primarily serves smaller general aviation aircraft (<12,500 lbs.). Following guidance from AC 150/5325-4C, *Runway Length Recommendations for Airport Design*, to accommodate 95 percent of small aircraft with less than 10 passenger seats, a runway length of 6,700 feet is recommended. To accommodate 100 percent of these small aircraft including those with 10 or more passenger seats, a runway length of 6,800 feet is recommended.

While it is desirable to have a general aviation crosswind runway meet the full-length recommendation, 80 percent of the full length is acceptable since there are two other longer runways. Therefore, a crosswind wind runway specifically serving smaller general aviation aircraft should be at least 5,500 feet long. Runway 12-30 is adequate to meet the needs of general aviation operators and should be maintained.

Runway 12-30 is adequate to meet the needs of general aviation operators and should be maintained.

Runway Width

The width of the runway is a function of the airplane design group (ADG) for each runway. Runways 8-26 and 3-21 are both planned to remain in ADG IV, which has a design standard width of 150 feet. Both runways are 150 feet wide and should be maintained. Runway 12-30 is planned to remain in ADG III, which has a runway width design standard of 100 feet. In 1999, Runway 12-30 was reconstructed and extended with FAA funding participation. At the time, the existing runway width was maintained at 150 feet. Runway 12-30 is currently 150 feet wide, thus exceeding the design standard, which should be maintained.

Runway Strength

An important feature of airfield pavement is its ability to withstand repeated use by aircraft. At the Sunport, pavement must be able to support multiple operations of large commercial and military aircraft daily.

The current strength rating for both Runway 8-26 and Runway 3-21 is 100,000 lbs. single wheel loading (S), 210,000 lbs. dual wheel loading (D), 360,000 lbs. for dual tandem wheel loading (DT), and 720,000 lbs. for double dual wheel loading (DDT). The current strength rating for Runway 12-30 is 65,000 lbs. S, 120,000 lbs. D. The runway is not strength rated for either DT or DDT aircraft landing gear. The pavement strength for all runways is adequate and should be maintained.

Specific details on the condition and history of airfield pavements are available in **Appendix B**.

TAXIWAYS

The design standards associated with taxiways are determined by the taxiway design group (TDG) or the ADG of the critical design aircraft. As determined previously, the applicable ADG for Runways 8-26 and 3-21 is ADG IV now and into the future. For crosswind Runway 12-30, the applicable design standard is ADG III. **Table 4G** presents the various taxiway design standards related to ADGs III and IV.

TABLE 4G
Taxiway Dimensions and Standards
Albuquerque International Sunport

STANDARDS BASED ON WINGSPAN	*ADG III*	*ADG IV*	
Taxiway Protection			
Taxiway Safety Area (TSA) width	118	171	
Taxiway Object Free Area (TOFA) width	186	259	
Taxilane Object Free Area width	162	225	
Taxiway Separation			
Taxiway Centerline to:			
Fixed or Movable Object	93	129.5	
Parallel Taxiway/Taxilane	152	215	
Taxilane Centerline to:			
Fixed or Movable Object	81	112.5	
Parallel Taxilane	140	198	
Wingtip Clearance			
Taxiway Wingtip Clearance	34	44	
Taxilane Wingtip Clearance	23	27	
STANDARDS BASED ON TDG	*TDG 2*	*TDG 3/4*	*TDG 5*
Taxiway Width Standard	35	50	75
Taxiway Edge Safety Margin	7.5	10	15
Taxiway Shoulder Width	10	20	25

ADG: Airplane Design Group
TDG: Taxiway Design Group
Source: FAA AC 150/5300-13A, Airport Design

The table also shows those taxiway design standards related to TDG. The TDG standards are based on the Main Gear Width (MGW) and the Cockpit to Main Gear (CMG) distance of the critical design aircraft expected to use those taxiways. Different taxiway and taxilane pavements can and should be designed to the most appropriate TDG design standards based on usage. **Table 4H** presents the TDG for most commonly utilized commercial service aircraft at the Sunport.

The minimum taxiway design for Runway 8-26 and 3-21 should be TDG 5 to meet the needs of the critical design aircraft, the Boeing 757. As such, the taxiways associated with these two runways and/or those commonly utilized by TDG 5 aircraft should be 75 feet wide. For Runway 12-30, the applicable taxiway design is TDG 3 to account for all general aviation aircraft. Thus, the taxiways associated with Runway 12-30 should be at least 50 feet wide.

The current taxiway system is composed of varying taxiway widths, with most being 75 feet wide. The current taxiway widths at the Sunport are sufficient to meet existing and planned aircraft TDG design criteria.

TABLE 4H
Aircraft by Associated TDG

Aircraft	TDG	RDC
Airbus A300/310	5	C-IV
Airbus A319/320	3	C-III
Boeing 717	3	C-III
Boeing 727	5	C-III
Boeing 737-700	3	C-III
Boeing 737-800/900	3	D-III
Boeing 747-4	6	D-V
Boeing 747-8	6	D-VI
Boeing 757 Series	5	D-IV
Boeing 767-800	5	C-IV
Boeing 777-300	6	D-V
Boeing 787-800	5	C-IV
Bombardier CRJ All Series	3	C-III
Embraer ERJ 175/195	3	C-III
MD-83/88	4	D-III

TDG: Taxiway Design Group
RDC: Runway Design Code
Source: FAA Data and Aircraft Certification Manuals

Taxiway Design Considerations

FAA AC 150/5300-13A, *Airport Design*, provides guidance on recommended taxiway and taxilane layouts to enhance safety by avoiding runway incursions. A runway incursion is defined as "any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft."

The taxiway system at the Sunport generally provides for the efficient movement of aircraft; however, recently published AC 150/5300-13A, *Airport Design*, provides updated recommendations for taxiway design. The following is a list of the taxiway design guidelines and the basic rationale behind each recommendation:

The current taxiway widths at the Sunport are sufficient to meet existing and planned aircraft TDG design criteria.

1. **Taxi Method**: Taxiways are designed for "cockpit over centerline" taxiing with pavement being sufficiently wide to allow a certain amount of wander. On turns, sufficient pavement should be provided to maintain the edge safety margin from the landing gear. When constructing new taxiways, upgrading existing intersections should be undertaken to eliminate "judgmental oversteering," which is where the pilot must intentionally steer the cockpit outside the marked centerline in order to assure the aircraft remains on the taxiway pavement.
2. **Steering Angle**: Taxiways should be designed such that the nose gear steering angle is no more than 50 degrees, the generally accepted value to prevent excessive tire scrubbing.
3. **Three-Node Concept**: To maintain pilot situational awareness, taxiway intersections should provide a pilot a maximum of three choices of travel. Ideally, these are right and left angle turns and a continuation straight ahead.

4. **Intersection Angles**: Design turns to be 90 degrees wherever possible. For acute angle intersections, standard angles of 30, 45, 60, 120, 135, and 150 degrees are preferred.
5. **Runway Incursions**: Design taxiways to reduce the probability of runway incursions.
   - *Increase Pilot Situational Awareness*: A pilot who knows where he/she is on the airport is less likely to enter a runway improperly. Complexity leads to confusion. Keep taxiways systems simple using the "three-node" concept.
   - *Avoid Wide Expanses of Pavement*: Wide pavements require placement of signs far from a pilot's eye. This is especially critical at runway entrance points. Where a wide expanse of pavement is necessary, avoid direct access to a runway.
   - *Limit Runway Crossings*: The taxiway layout can reduce the opportunity for human error. The benefits are twofold – through simple reduction in the number of occurrences, and through a reduction in air traffic controller workload.
   - *Avoid "High-Energy" Intersections*: These are intersections in the middle third of runways. By limiting runway crossings to the first and last thirds of the runway, the portion of the runway where a pilot can least maneuver to avoid a collision is kept clear.
   - *Increase Visibility*: Right angle intersections, both between taxiways and runways, provide the best visibility. Acute angle runway exits provide for greater efficiency in runway usage but should not be used as runway entrance or crossing points. A right angle turn at the end of a parallel taxiway is a clear indication of approaching a runway.
   - *Avoid "Dual Purpose" Pavements*: Runways used as taxiways and taxiways used as runways can lead to confusion. A runway should always be clearly identified as a runway and only a runway.
   - *Indirect Access*: Do not design taxiways to lead directly from an apron to a runway. Such configurations can lead to confusion when a pilot typically expects to encounter a parallel taxiway.
   - *Hot Spots*: Confusing intersections near runways are more likely to contribute to runway incursions. These intersections must be redesigned when the associated runway is subject to reconstruction or rehabilitation. Other hot spots should be corrected as soon as practicable.
6. **Runway/Taxiway Intersections**:
   - *Right Angle*: Right-angle intersections are the standard for all runway/taxiway intersections, except where there is a need for a high-speed exit. Right-angle taxiways provide the best visual perspective to a pilot approaching an intersection with the runway to observe aircraft in both the left and right directions. They also provide optimal orientation of the runway holding position signs, so they are visible to pilots.
   - *Acute Angle*: Acute angles should not be larger than 45 degrees from the runway centerline. A 30-degree taxiway layout should be reserved for high speed exits. The use of multiple intersecting taxiways with acute angles creates pilot confusion and improper positioning of taxiway signage.
   - *Large Expanses of Pavement*: Taxiways must never coincide with the intersection of two runways. Taxiway configurations with multiple taxiway and runway intersections in a single area create large expanses of pavement, making it difficult to provide proper signage, marking, and lighting.

7. **Taxiway/Runway/Apron Incursion Prevention**: Apron locations that allow direct access into a runway should be avoided. Increase pilot situational awareness by designing taxiways in such a manner that forces pilots to consciously make turns. Taxiways originating from aprons and forming a straight line across runways at mid-span should be avoided.
8. **Wide Throat Taxiways**: Wide throat taxiway entrances should be avoided. Such large expanses of pavement may cause pilot confusion and makes lighting and marking more difficult.
9. **Direct Access from Apron to a Runway**: Avoid taxiway connectors that cross over a parallel taxiway and directly onto a runway. Consider a staggered taxiway layout that forces pilots to make a conscious decision to turn.
10. **Apron to Parallel Taxiway End**: Avoid direct connection from an apron to a parallel taxiway at the end of a runway.

FAA AC 150/5300-13A, *Airport Design*, states that, "Existing taxiway geometry should be improved whenever feasible, with emphasis on designated 'hot spots.'" To the extent practicable, the removal of existing pavement may be necessary to correct confusing layouts. **Exhibit 4H** identifies all airfield areas of concern.

The FAA has identified the following four "hot spots" on the airfield described as follows:

Hot Spot 1: The hold short marking on Taxiway E1 currently serves both Runways 8 and 12. When instructed to move beyond this point to the runway threshold, pilots must be sure to line up on the correct runway. Ideally, a single threshold taxiway would provide access to only one runway.

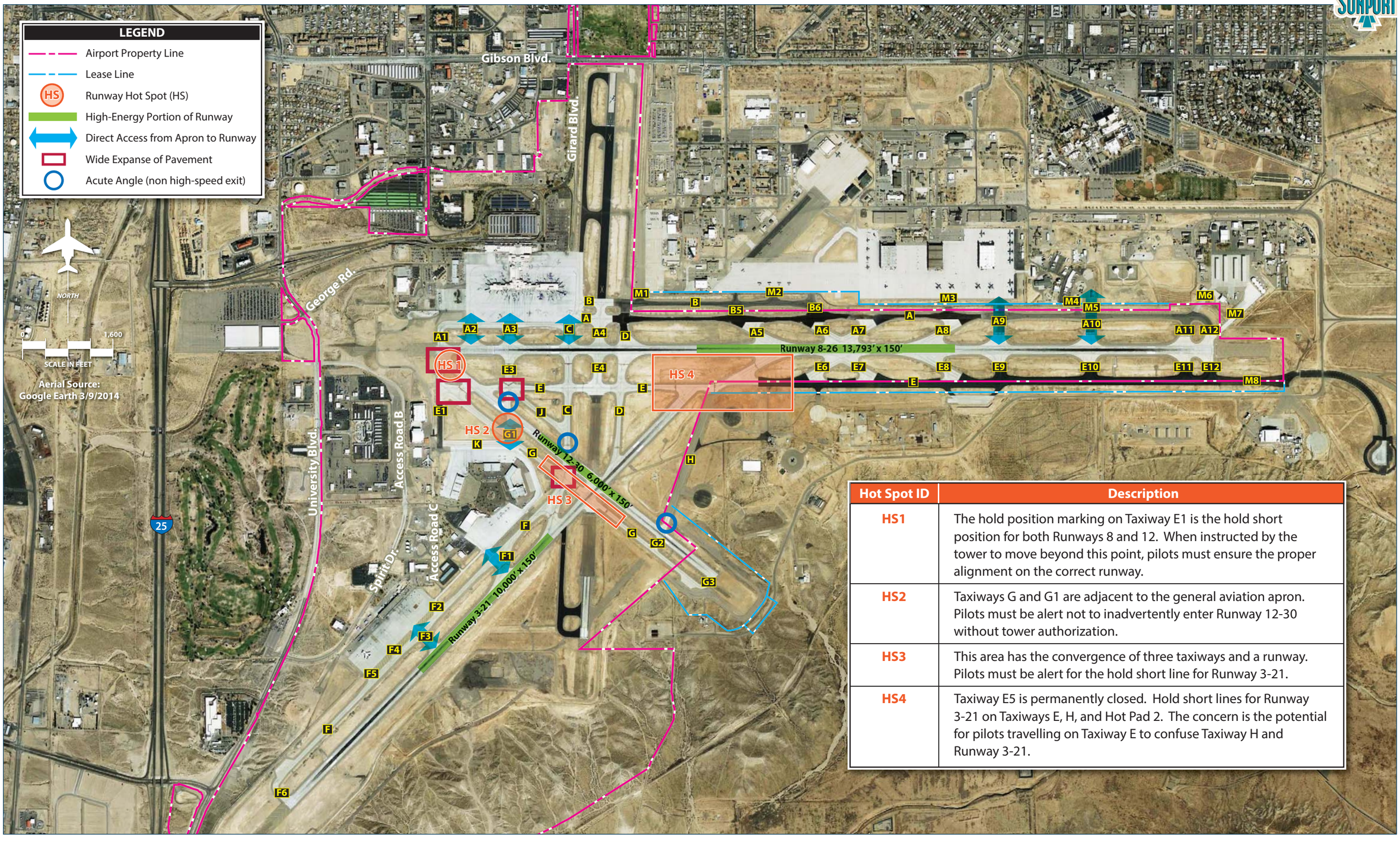
Hot Spot 2: Taxiway G1 provides direct access from the general aviation apron to Runway 12-30. Ideally, pilots would have to make a turn from the apron onto parallel Taxiway G prior to turning to the Runway.

Hot Spot 3: This area has the convergence of three taxiways (C, G, and F) and a runway (12-30). This layout may be confusing to pilots.

Hot Spot 4: The hold short lines on Taxiways E and H in the vicinity of the Runway 21 may be confusing to pilots. Ideally, the hold short lines would allow an aircraft to be perpendicular to the Runway threshold. The hold short line on Taxiway H is particularly problematic as pilots would have virtually no peripheral view of the activity on Runway 3-21.

In the alternatives chapter, potential solutions to each of these Hot Spots will be presented.

Exhibit 4H also highlights the location of the "high-energy" portion of each runway (middle third). As noted above, FAA airfield geometry standards indicate that there should be no taxiways crossing a runway in the high-energy areas. There are three locations on the airfield where runway crossings are located within the "high-energy" portion of the runway. Two of them are high-speed exits for Runway 8-26 which are not typically utilized to cross the runway and are instead used to exit the runway. The third is the Taxiway C crossing of Runway 12-30. This taxiway is highly utilized to traverse the airfield, so pilots



Hot Spot ID	Description
HS1	The hold position marking on Taxiway E1 is the hold short position for both Runways 8 and 12. When instructed by the tower to move beyond this point, pilots must ensure the proper alignment on the correct runway.
HS2	Taxiways G and G1 are adjacent to the general aviation apron. Pilots must be alert not to inadvertently enter Runway 12-30 without tower authorization.
HS3	This area has the convergence of three taxiways and a runway. Pilots must be alert for the hold short line for Runway 3-21.
HS4	Taxiway E5 is permanently closed. Hold short lines for Runway 3-21 on Taxiways E, H, and Hot Pad 2. The concern is the potential for pilots travelling on Taxiway E to confuse Taxiway H and Runway 3-21.

Exhibit 4H
AIRFIELD HOT SPOT AND GEOMETRY ISSUES

This page intentionally left blank

must be particularly aware of the runway crossing. In the alternatives chapter, potential solutions to mitigating the high-energy runways crossings will be examined.

There are several locations on the airfield where wide expanses of pavement exist, which can be confusing to pilots. Three prominent ones are identified on **Exhibit 4H**. In the alternatives chapter, options to mitigate these areas will be examined.

All entrance/exit taxiways should interface the runway to allow aircraft to hold at a 90-degree orientation with the runway centerline. This allows the pilot full operational view of the runway in both directions. Access to runways is preferred to be at a 90-degree angle, unless a high-speed exit is needed. Taxiways G1, C, and F enter Runway 12-30 at non-preferred angles. Options will be considered in the alternatives chapter to provide only 90-degree runway access points unless a high-speed exit is applicable.

Another airfield geometry standard that does not conform to FAA standard is the direct aircraft ramp to runway access. FAA's Runway Safety Action Team (RSAT) study indicates that runway incursion risks increase when a pilot can traverse directly from a ramp or non-movement area to an active runway without having to make a turn. The FAA recommends that all direct access linking a ramp with a runway be modified by relocating the taxiway or developing "no taxi islands" on the ramp to prohibit direct access. There are several direct access points at the Sunport as follows:

The FAA recommends that all direct access linking a ramp with a runway be modified by relocating the taxiway or developing "no taxi islands" on the ramp to prohibit direct access.

- Taxiways A2, A3, and C from the main terminal apron to Runway 8-26;
- Taxiways A9 and A10 from the military apron to Runway 8-26;
- Taxiway G1 from the general aviation apron to Runway 12-30;
- Taxiways F1 from the general aviation apron to Runway 3-21; and
- Taxiway F3 from the cargo apron to Runway 3-21.

Analysis in the following chapter will outline options for correcting the nonstandard direct access taxiway alignments.

Taxiway Exits

Each runway has associated taxiway exits. Those exits that also form a runway crossing are only counted as a single exit. Runway 8-26 has fourteen exits. These are comprised of four high-speed exits and ten exits providing 90-degree ingress/egress.

Runway 3-21 has six exits. Exits at Taxiways F1, C, and D, are angled and can be considered high-speed exits. Exits at F6 and F3 are 90-degree exits. Aircraft can also exit at the end of Runway 3 via Taxiway E.

The space between Taxiways F3 and F6 is approximately 3,750 feet. This distance leads to a very long roll out and return taxi for aircraft landing on Runway 21. The current Airport Layout Plan includes an additional exit between Taxiways F3 and F6. Interviews with airport operators also indicate the need for an additional exit between the two. Future planning will maintain an additional taxiway exit.

Runway 12-30 has six exits which are Taxiways G3, G2, G1, C, E3, and E1. Exits at E1 and G1 are considered Hot Spots by the FAA. This runway and the associated exits will be analyzed in the Alternatives Chapter. The recommendation from that analysis may include changes to the taxiway exit geometry.

The FAA has indicated that any excess pavement at airports, including potentially unnecessary taxiways, be identified. The alternatives chapter will present analysis of the optimal location for runway exits. If any exit taxiways are not necessary for capacity or efficiency, then a recommendation for removal of those taxiways will be presented.

If any exit taxiways are not necessary for capacity or efficiency, then a recommendation for removal of those taxiways will be presented.

INSTRUMENT NAVIGATIONAL AIDS

Instrument approaches to Runways 8 and 3 are served by sophisticated ILS precision instrument approaches offering Category I (CAT-I) minimums. These approaches allow properly equipped aircraft and pilots the ability to operate with weather minimums as low as 200-foot cloud heights and 2,400 feet runway visibility range (RVR). The HI-TACAN instrument approach to Runway 8 allows for slightly lower ⅜-mile visibility minimums.

Instrument approaches based on GPS have become very common across the country. Runways 8-26 and 3-21 are served by GPS approaches. A variant of GPS referred to as RNP (required navigation performance) allows an aircraft to fly a specific path between two 3D-defined points in space. RNP instrument approaches allow for more efficient curved flight paths through congested airspace, around noise sensitive areas, or through difficult terrain. The Sunport has RNP instrument approaches at both ends of Runway 8-26 and 3-21. Runway 12-30 does not have instrument approaches and is available for visual operations only.

The ILS and GPS approaches are excellent instrument approach procedures providing all-weather capability for the Sunport. As such, these procedures should be maintained in the future. As a busy commercial service airport, any potential improvements to the instrument approach minimums should be given consideration. GPS instrument approaches to Runway 12-30 will also be considered.

VISUAL NAVIGATION AIDS

The airport beacon is located on top of the control tower. The beacon provides for rapid identification of the airport with a rotating light that is green on one side and white on the opposite. The beacon should be maintained through the planning period.

All runway ends are equipped with visual glideslope indicator light systems, except Runway 12. The four-box precision approach path indicators (PAPIs) are available on Runways 26, 3, 21, and 30. Runway 8 provides the six-light staggered Visual Approach Slope Indicator (VASI) light system. Once this system reaches the end of its useful life, it should be replaced with the PAPI-4L system. If feasible, the PAPI system should be considered for the approach to Runway 12.

Runway end identification lights (REIL) are strobe lights set to either side of the runway. These lights provide rapid identification of the runway threshold. REILs should be installed at runway ends not currently providing an approach lighting system but supporting instrument operations. Currently, this would apply to runway ends 26 and 21, which are equipped with REILs and should be adequate unless replaced by a more sophisticated approach lighting system (ALS). An ALS would only be required on Runways 26 and 21 if the instrument approach procedure minimums were lower than ¾-mile, which is not currently planned. As such, the REILs should be maintained throughout the planning period.

The FAA recommends an approach lighting system for instrument approaches not lower than ¾-mile and requires one for lower visibility minimums. Runways 8 and 3 are equipped with a medium intensity approach lighting system with runway alignment indicator lights (MALSR). This system should be maintained in the future. Approach lighting systems are not anticipated for any other runway ends.

WEATHER AND COMMUNICATION AIDS

Albuquerque International Sunport has five lighted wind cones located in proximity to the approach ends of Runways 8, 26, 3, 21, and 30. Wind cones provide information to pilots regarding wind conditions, including direction and speed. These wind cones should be maintained.

The airport traffic control tower (ATCT) provides an automated terminal information service (ATIS). ATIS broadcasts contain essential information, such as weather information, active runways, available approaches, and any other information required by the pilots, such as important NOTAMs. These broadcasts are updated hourly.

Albuquerque International Sunport is equipped with an Automated Surface Observing System (ASOS). This is an important system that automatically records weather conditions such as wind speed, wind gust, wind direction, temperature, dew point, altimeter setting, visibility, fog/haze condition, precipitation, and cloud height. This information can be accessed by pilots and individuals via an automated voice recording on a published telephone number. This system should be maintained through the planning period.

Many commercial service airports have runway visual range equipment providing visibility measuring and reporting equipment at specific locations adjacent to the runway. Runways 8-26 and 3-21 should be considered for RVR equipment.

A summary of the airside needs at Albuquerque International Sunport is presented on **Exhibit 4J**.

LANDSIDE REQUIREMENTS

Landside facilities are those necessary for handling aircraft and passengers while on the ground. These facilities provide the essential interface between the air and ground transportation modes. The capacities of the various components of each area were examined in relation to projected demand to identify future landside facility needs. This includes components for commercial service and general aviation needs such as:

- Passenger Terminal Complex Requirements
- Air Cargo Facilities Requirements
- General Aviation Requirements
- Airport Support Requirements

PASSENGER TERMINAL COMPLEX

The following resources were consulted to identify existing and future terminal building needs:

- Airport Cooperative Research Program (ACRP), Report 25, *Airport Passenger Terminal Planning and Design, Volume 1: Guidebook*.
- ACRP, Project Number 07-04, *Spreadsheet Models for Terminal Planning and Design*.
- FAA Advisory Circular (AC) 150/5360-13, *Planning and Design Guidelines for Airport Terminal facilities*.
- International Air Transport Association (IATA), *Airport Development Reference Manual*.

Components of the passenger terminal complex include aircraft gate positions, departures processing, arrivals processing, concourse facilities, as well as public spaces. This section identifies the functional components of the terminal building and offers required space needed for projected passenger demand levels for each component.

Many aspects of passenger terminal design are based upon peaking periods of commercial activity as determined by the flight schedules for the Sunport. The flight schedule for Tuesday, June 10, 2014 was utilized as the basis for this analysis. This day represents an average peak day in the peak month for enplanement activity.

Exhibit 4K presents a summary of the terminal building space needs by functional area and by gross terminal area. The exhibit also includes a potential High Range enplanement forecast. This high range is approximately 15 percent greater than the long-range forecast. The high range forecast is included so that Sunport management can adapt to any significant change in enplanements that were not originally forecast.

CATEGORY	RUNWAY 8-26 EXISTING	RUNWAY 8-26 POTENTIAL REQUIREMENTS	RUNWAY 3-21 EXISTING	RUNWAY 3-21 POTENTIAL REQUIREMENTS	RUNWAY12-30 EXISTING	RUNWAY12-30 POTENTIAL REQUIREMENTS
RUNWAYS						
RDC	D-IV-1600	Same	D-IV-2400	Same	B-III-VIS	Same
Length x Width (in feet)	13,973 x 150	Same	10,000 x 150	11,000 x 150	6,000 x 150	Same[1]
Pavement Strength (in pounds)						
Single Wheel Loading (S)	100,000	Maintain	100,000	Maintain	65,000	Maintain
Dual Wheel Loadint (D)	210,000	Maintain	210,000	Maintain	120,000	Maintain
Dual Tandem Wheel Loading (DT)	360,000	Maintain	360,000	Maintain	NA	Maintain
Double Dual Tandem Wheel Loadint (DDT)	720,000	Maintain	720,000	Maintain	NA	NA
Runway Design Standards[2]						
Runway Safety Area (RSA)	1.6 ac on KAFB	Lease or Buy RSA Land	0.2 ac on KAFB	Lease or Buy RSA Land	Meets Standard	Maintain
Runway Object Free Area (ROFA)	7.4 ac on KAFB	Lease or Buy ROFA Land	1.1 ac on KAFB	Lease or Buy ROFA Land	Meets Standard	Maintain
Runway Obstacle Free Zone (ROFZ)	0.6 ac on KAFB	Lease or Buy ROFZ Land	Meets Standard	Maintain	Meets Standard	Maintain
Precision Obstacle Free Zone (POFZ)	15' Penetration on Twy A	See Alternatives Analysis	Meets Standard	Maintain	NA	NA
Runway Protection Zones (RPZ)						
Owned/Airspace Control	Owned (8)/17.6 ac on KAFB (26)	Maintain (8)/ Lease or Buy RPZ land (26)	3.05 ac outside ABQ control (3)/ Owned (21)	Acquire 3.05 ac (3)	Own	Maintain
Incompatible Uses	None (8)/ Existing Fuel Farm (26)	Maintain	Existing Road (3)/None (21)	Maintain	None	Maintain
TAXIWAYS						
TDG	5	Same	5	Same	3	Same
Parallel Taxiway	Dual Full Length	Maintain	Partial	Maintain	Full Length	Maintain
Number of Exits	Fourteen	To Be Determined	Six	Add 1 exit between F3 and F6	Six	Maintain[1]
Taxiway Width (in feet)	Varys	Maintain	Varys	Maintain	Varys	Maintain
AIRFIELD GEOMETRY						
Hot Spots	Yes	Mitigate	No	Maintain	Yes	Mitigate
High Energy Crossing	Yes	Mitigate	No	Maintain	Yes	Mitigate
Direct Access to Runway from Apron	Yes	Mitigate	Yes	Mitigate	Yes	Mitigate
Wide Expanse of Pavement	Yes	Mitigate	No	Maintain	Yes	Mitigate
Acute Angled Exits (Other than high-speed exits)	Meets Standard	Maintain	Meets Standard	Maintain	Non-Standard	Mitigate
INSTRUMENT APPROACH PROCEDURES						
ILS	Yes - CAT I	Maintain	Yes - CAT I	Maintain	NA	NA
GPS (including RNP)	Yes	Maintain	Yes	Maintain	NA	Consider 1-mile Non-precision
Other	NA	NextGen Approaches	NA	NextGen Approaches	NA	NextGen Approaches
LIGHTING AND MARKING						
Runway Lighting	HIRL	Maintain	HIRL	Maintain	MIRL	Maintain
Centerline Lights	Yes	Maintain	Yes	Maintain	No	Maintain
Touchdown Zone Lighting	Yes (8)/No (26)	Maintain	Yes (3)/ No (21)	Maintain	No	Maintain
Runway Marking	Precision	Maintain	Precision	Maintain	Basic	Maintain
Taxiway Marking	Yes	Maintain	Yes	Maintain	Yes	Maintain
Approach Lighting System	MALSR (8)	Maintain	MALSR (3)	Maintain	NA	NA
Visual Approach Aids	VASI-6L (8)/PAPI-4L (26)	Replace VASI with PAPI-4L/Maintain	PAPI-4L	Maintain	None (12)/ PAPI-4L (30)	Maintain
NAVIGATION AND WEATHER AIDS						
	Existing: ATCT, ATIS, Five lighted windcones, Beacon		**Potential Requirements:** Maintain all/ Consider RVR Equipment for Rwy 8-26 and 3-21			

[1] Airfield geometry improvements may necessitate changes.
[2] Land leased by the Sunport is considered to be under Sunport control. These area measurements only apply to land not leased or owned by the Sunport.

KEY:

ac - Acres
RDC - Runway Design Code
TDG - Taxiway Design Code
ILS - Instrument Landing System
GPS - Global Positioning System
RNP - Required Navigation Performance
MALSR - Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
VASI - Visual Approach Slope Indicator
PAPI - Precision Approach Path Indicator
HIRL/MIRL - High/Medium Intensity Runway Lights

This page intentionally left blank

FUNCTIONAL AREA	Unit	Available	FORECAST Short 2,490,000	Intermediate 2,750,000	Long 3,330,000	High Range 3,830,000
DEPARTURES PROCESSING						
Ticket Counters						
Utilization Factor	80%		1,000	1,112	1,344	1,496
Counter Frontage	LF	410	229	254	307	342
Counter Area	SF	3,770	1,830	2,030	2,460	2,740
Airline Ticket Office	SF	16,100	11,429	12,709	15,360	17,097
Outbound Baggage/Screening	SF	21,714	13,029	14,488	17,510	19,491
Agent Positions	#	64	29	32	38	43
Kiosk Positions	#	14	6	6	7	8
Curbside Positions	#	12	4	4	5	6
Ticket Lobby						
Queuing Area	SF	14,500	9,700	10,790	13,040	14,510
Ticket Lobby Circulation	SF	16,316	7,086	7,879	9,523	10,600
Security Stations						
X-Ray Machines	#	16	8	9	11	12
Queing Area	SF	9,952	3,019	3,357	4,057	4,516
Station Area	SF	15,453	6,400	7,200	8,800	9,600
EDS Automated Machines	#	6	7	7	7	7
TSA Administration/Operations[1]	SF	2,100	10,000	11,000	13,300	15,300

FUNCTIONAL AREA	Unit	Available	FORECAST Short 2,490,000	Intermediate 2,750,000	Long 3,330,000	High Range 3,830,000
ARRIVALS PROCESSING						
Baggage Claim						
Passengers Claiming Bags	75%		818	908	1,095	1,223
Claim Display Frontage	LF	840	491	545	657	734
Baggage Service Office	SF	3,100	981	1,089	1,314	1,467
Claim Lobby						
Claim Lobby Floor Area	SF	22,181	14,960	16,607	20,039	22,372
Claim Lobby Circulation Area	SF	29,656	11,690	12,977	15,659	17,482

FUNCTIONAL AREA	Unit	Available	FORECAST Short 2,490,000	Intermediate 2,750,000	Long 3,330,000	High Range 3,830,000
CONCOURSE FACILITIES						
Passenger Holdrooms						
Gates	#	22	19	20	22	24
Holdroom Area	SF	62,138	51,300	54,000	59,400	64,800
Concourse Circulation						
Circulation Area	SF	33,796	28,250	31,414	37,968	42,262
PUBLIC SPACES						
Restrooms						
Area	SF	25,457	14,040	15,600	18,840	21,000
Concessions						
Food & Beverage	SF	36,170	37,350	41,250	49,950	57,450
Retail	SF	18,200	19,920	22,000	26,640	30,640
Public Area						
Circulation	SF	49,377	35,100	39,000	47,100	52,500

FUNCTIONAL AREA	Unit	Available	FORECAST Short 2,490,000	Intermediate 2,750,000	Long 3,330,000	High Range 3,830,000
LOCAL AND FEDERAL OFFICES						
Airport Administration						
Administration/Operations/Police	SF	75,120	68,000	70,000	74,000	78,000
Admin Circulation	SF	12,559	11,369	11,703	12,372	13,040
Inspection Services						
Federal Inspection Services	SF	7,639	6,150	7,728	8,371	11,394
FUNCTIONAL AREA TOTAL						
Total Programmed Functional Area	SF	475,298	361,602	392,821	455,703	506,261
BUILDING SYSTEMS/SUPPORT						
Mechanical/HVAC	SF	87,567	87,567	87,587	87,587	87,587
Stairwells/Storage	SF	39,707	39,707	39,707	39,707	39,707
Unclassified/Vacant	SF	23,976	23,976	23,976	23,976	23,976
Airline Back Office (not ticket or baggage office)	SF	13,180	13,180	13,180	13,180	13,180
Unenclosed Storage	SF	24,928	24,928	24,928	24,928	24,928
Tug Drive	SF	31,422	31,422	31,422	31,422	31,422
TOTAL TERMINAL						
Gross Building Area	SF	696,078	582,382	613,621	676,503	727,061

[1] TSA leases an additional 10,400 sf in the Old Terminal Building

This page intentionally left blank

Aircraft Gates

Several methods were utilized to determine aircraft gate requirements for the Sunport. The first is the Gate Demand model from ACRP Report 25. This model utilizes two different approaches. The first approach uses the current ratio of annual passengers per gate, adjusted for forecast changes in fleet mix and annual load factors. This methodology assumes that the pattern of gate utilization will remain relatively stable over the 20-year forecast period. The changes in passengers per gate are due to changes in enplanements per departure (due to forecast increases in seating capacity and load factors), as opposed to increasing or decreasing the number of departures per gate. The second ACRP method considers increases in the number of departures per gate.

The two methods are then averaged to arrive at the aircraft gate forecast. In the short-term, 19 gates are estimated to be needed. In the intermediate-term, 20 gates are required, and in the long-term, 22 gates are required. The high range forecast results in a need for 24 aircraft gate positions, which is two more than is currently available.

FAA AC 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities* was also consulted. The AC provides three methodologies: one based on the peak hour utilization rate, the second utilizes the daily departure for a daily utilization rate, and the third considers an annual utilization rate. Each of these was found to be consistent with the ACRP methodology.

Terminal Apron Requirements

The main terminal apron is adequately sized through the long-term.

There are four primary considerations that govern efficient aircraft apron design: the movement and physical characteristics of the aircraft to be served; the maneuvering, staging, and location of ground servicing equipment and underground utilities; the dimensional relationships of parked aircraft; and the safety, security, and operational practices related to apron control. The optimal apron design will depend upon available space, aircraft mix, and terminal configuration.

The main terminal area apron provides approximately 150,000 square yards of pavement with an additional 68,000 square yards available for aircraft not needing to park at the terminal gate. The main terminal apron is adequately sized through the long-term. If the high range enplanement forecast (3,830,000) were to be reached, then additional gates and terminal apron area may be required. The size of the additional apron will need to be able to accommodate the aircraft type intended to use it, and additional circulation apron will be necessary.

Terminal Building Requirements

The requirements for the passenger terminal building begin with a demand/capacity analysis of the existing facilities that identifies the current capacity of key processing areas for comparison to the

passenger demand at the Sunport. The purpose of the analysis is to quantify and qualify the ability of the existing terminal facilities to satisfy the current demand of the traveling public at the Sunport. A spreadsheet model based on industry standards and calibrated for the Sunport based upon observations of passenger activities and terminal operations and design was used in this analysis. The model utilizes the standard queuing theory which can be defined as: passengers arriving minus passengers processed equals passengers in queue. The evaluation of individual processing elements is based on industry standards and formulas.

The model considers the level of service standards established by the International Air Transport Association (IATA). Level of service (LOS) defines the comfort and quality of the passenger experience. Some are related to crowding in queuing areas, while others define the amount of time a passenger must wait for processing. **Table 4J** outlines the basic level of service standards, while **Exhibit 4K** outlines space requirements for each functional element of the passenger terminal building.

In general, LOS C is a typical design goal for most airports. LOS B would be a preferred goal if the budget allows. LOS A is generally too expensive to achieve, and thus prohibitive to implement. For purposes of this analysis, LOS C+ was used to represent a median between LOS B and C.

TABLE 4J
Level of Service Standards (IATA)
Albuquerque International Sunport

AREA PER OCCUPANT								
Level of Service Standards	**A** Ft^2	**B** Ft^2	**C+** Ft^2	**C** Ft^2	**C-** Ft^2	**D** Ft^2	**E** Ft^2	**F** Ft^2
Check-in Queue Area	19.4	17.2	16.1	15.1	14	12.9	10.8	-
Wait/Circulate	29.1	24.8	22.6	20.4	18.3	16.1	12.8	-
Holdroom	15.1	13.5	12.8	12	11.3	10.5	8	-
Bag Claim Area (excl. claim device)	21.5	19.4	18.3	17.2	16.1	15.1	12.9	-
Federal Inspection Services	15.1	12.9	11.8	10.8	9.7	8.6	6.5	-

A – Excellent levels of service; conditions of free flow; excellent level of comfort.
B – High level of service; condition of stable flow; very few delays; high level of comfort.
C – Good level of service; condition of stable flow; acceptable delay; good level of comfort.
D – Adequate level of comfort and service; condition of unstable flow; acceptable delays for short periods.
E – Inadequate level of service; condition of unstable flow; unacceptable delays; inadequate levels of comfort.
F – Unacceptable levels of comfort and service; conditions of cross flows, system breakdown and unacceptable delays; applies to areas below LOS E.

Departures Processing

The first destination for most enplaning passengers in the terminal building is the ticket counters. The ticketing area includes the counters, queuing area and lobby, the ticket offices, and bag screening and processing. Security screening is also included in the departures processing element.

Ticket Counters - The percentage of the departing passenger peak hour demand that checks in at the ticket lobby is estimated at 80 percent. The remainder are assumed to check in prior to arriving at the Sunport and do not have checked baggage. The capacity at the ticket counters was calculated based on the passenger processing rate derived from observation and IATA averages.

The ticket counter functions appear to be adequate through the long-term planning period. Only when considering a high range enplanement forecast does the airline ticket office element become somewhat constrained.

Ticket Lobby - The adequacy of the ticket lobby floor area is also evaluated to determine whether demand levels result in an acceptable level of service. The ticket lobby demand included a percentage of well-wishers in addition to the passengers. Industry standards assume that some passengers enter the queue with their friends or family for assistance. The evaluation was based on a service goal of a 2.5-minute maximum wait in queue and an LOS C+ of 16.1 square feet per person in queue with baggage.

Both the queuing and ticket lobby circulation elements are adequate through the long-term planning period. The queuing area would slightly exceed capacity under the high range forecast; however, the ticket lobby circulation element is well under capacity so some of this area could be converted to queuing area to compensate.

Bag Screening and Processing – The Transportation Security Administration (TSA) must inspect every checked bag that is to be put on an aircraft. Each airline contracts with TSA for this service. United, American, US Airways and Delta each have one in-line screening machine (CT-80DR+) located behind the airline ticket office. Southwest has two in-line machines (CT-80). Bags for Alaska and Jetblue flights are manually inspected. The space available behind the airline offices is adequate through the long-term planning period, however, consideration should be given to a more fully automated, in-line system rather than the current method.

Passenger Security Screening - The required queuing area for the checkpoint was determined using an area of 16.1 square feet per person at a level of service LOS C+. Across the country, TSA is making efforts to help streamline the screening process. Efforts are being made to provide staff during peak periods, install new equipment, and open pre-check lanes. The security screening at the Sunport consists of 16 X-ray machines for bags. Passengers then pass through either a metal detector, of which there are eight, or they pass through one of six EDS automated body scanning machines.

The passenger security queuing and station area is adequate through the long-term and high range forecast. There are two smaller TSA offices in the security screening area. The main TSA offices arein the old terminal building. The total TSA office space is adequate through the intermediate-term. When considering the long-term and high range scenarios, TSA office space may be somewhat constrained.

Arrivals Processing

The passenger arrivals process consists primarily of those facilities and functions that provide means to reunite the arriving passenger with items that were checked at the origin of the flight.

Baggage Claim - It is estimated that 70 percent of arriving peak hour passengers claim checked baggage. The remaining 30 percent of the passengers bypass the baggage claim areas and go directly to the curb or to other ground transportation related facilities. An industry standard of 1.3 checked bags per passenger is utilized. The baggage claim capacity is based on the device frontage per person.

Claim Lobby - The lobby area adjacent to the baggage claim device includes space from the edge of the claim device to the railings surrounding the bag claim devices. Claim lobby area is based on meeting LOS C+ and is calculated as 18.3 square feet per person. The claim lobby floor area is adequate through the long-term; however, if the high range forecast is reached, then the claim lobby floor area may become constrained. The claim circulation area is adequate through the long-term and high range forecast planning periods.

Concourses

The concourses consist primarily of the public circulation spaces and secure passenger holdrooms. While holdrooms and circulation are calculated separately, it is common for actual usage to include both elements. For example, while passengers are waiting, they will typically disperse throughout the secure concourse. As it gets closer to boarding time, passengers tend to gather in the gate area. As a result, it is common to consider holdroom and concourse capacity in aggregate.

Holdrooms - The holdroom capacity is based upon available seats for the design aircraft for each gate and average load factor at the Sunport. Podium space and queuing/exit space is also considered. Holdroom spaces are adequate for current gate numbers through the long-term planning period. Additional hold room space may be necessary if the high range forecast is realized.

Circulation – The holdrooms are located on either side of the circulation element. The circulation requirement is based upon providing circulation at 22.6 square feet per occupant. The concourse circulation area is adequate through the intermediate planning period. The circulation element is shown to be constrained in the long-term planning horizon.

Public Spaces

Public spaces include restrooms, concessions, and other public areas.

Restrooms - Restrooms are strategically located throughout the terminal building on both the public and secure sides. Restroom capacity is calculated based on square footage per peak hour passenger, as provided in FAA Advisory Circular 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities*. Current restroom capacity is adequate through the high range forecast.

Concessions and Retail - While planning standards and demand are an important consideration in the adequacy of concessions in a terminal, there are marketing considerations that determine the capacity and economic viability of airport food/beverage services and retail concessions. Concessions and retail are available on both the secure and non-secure sides of the terminal.

Concessions are based on providing 15 square feet per 1,000 annual enplaned passengers. Retail space is estimated as eight square feet per 1,000 annual enplaned passengers. Both are forecast to be at capacity by the end of the short-term planning period; however, local economies will heavily influence actual space needed for these functions.

Local and Federal Offices

Administrative Spaces - Often airport administrative offices are located within an airport terminal building. At the Sunport, the administration occupies space on each floor. By industry standards, the administrative offices are properly sized through the long-term planning period. The high-range forecast indicates that administrative space may exceed capacity at that time.

Inspection Services – ACRP Report 25 presents a model for estimating space requirements for processing international passengers through customs. Factors such as the number of flights, passenger loading factors, and acceptable LOS are considered. Currently, the Sunport does not have regularly scheduled international flights requiring customs processing; however, on occasion unscheduled international flights will operate along with some international general aviation flights. As a medium hub commercial service airport and a border state, the availability of customs service is important.

Since, the forecasts of aviation activity do not anticipate a significant increase in international activity, the current space allocated to inspection services is adequate. Additional space may be necessary if international service were to resume at the Sunport.

Building Systems and Support

The systems and support functions include mechanical rooms, heating and air conditioning (HVAC), unenclosed storage, the baggage tug drive, stairwells, and storage. These elements are necessary for the continued efficiency of the Sunport terminal building. These elements are not specifically forecast; however, if the building were to be expanded in the future, these elements should also be considered.

Total Terminal Building Requirements

At nearly 700,000 square feet, the current terminal building is adequately sized through the long-term planning period. If the high-range enplanement forecast is reached, then the estimated gross terminal building size should be approximately 727,000 square feet. Current storage and vacant space would easily provide enough space if converted to specific functional uses to cover the deficit.

At nearly 700,000 square feet, the current terminal building is adequately sized through the long-term planning period.

Certain functional elements may become constrained within the 20-year planning horizon of the Master Plan. For example, additional concession and retail space could be needed in

the short-term. Over time, utilization of space may need to change to accommodate changing needs. For example, in the ticket lobby area, airlines are utilizing self-check-in procedures to a greater degree; therefore, there may not be a need for as many agent-staffed positions.

TERMINAL CURB

The terminal curb element is the direct interface between the terminal building and the ground transportation system. The length of curb available for loading and unloading passengers and baggage is determined by the type and volume of ground vehicles anticipated during the peak period on the design day. The airport has approximately 630 feet of enplaning/departure curb along the elevated roadway fronting the terminal. On the lower level, there is 660 feet of deplaning/arrival curb fronting the building for use by autos and taxis. In addition, there is a commercial island with 660 feet of additional space for use by commercial vehicles such as shuttles and full-size buses.

During the previous master planning effort, a curb survey was performed from January 10-13, 2000, to determine the vehicle mix and average dwell times at the curb fronts. At the time, the major improvements, such as the split terminal roadway system, the parking structure, and the consolidated rental car facility, had been completed. Since then, dwell times for vehicles utilizing the terminal curbs has decreased significantly due to security procedures instituted following 9/11.

The hourly vehicle count from the 2000 curb survey was adjusted down approximately 20 percent to account for the decrease in total enplanements and then the modal split (i.e., private autos, rental car shuttles, taxis, hotel shuttles and limousines) was applied. These raw figures were then input into the ARCP spreadsheet model. The output from the model is the curb length range required to maintain a LOS "C."

Table 4K provides the curb length analysis for the departure/enplanement, arrival/deplanement, and commercial median curbs. All three terminal curbs are adequately sized through the long-term planning period. With the high-range enplanement forecast, the departure/enplanement curb begins to slightly exceed the available curb length. Planning for additional terminal curb length is not a high priority for this Master Plan.

TABLE 4K
Terminal Curb Requirements - Level of Service "C"
Albuquerque International Sunport

	Current	Short	Intermediate	Long	High-Range
Annual Enplanements	2,446,388	2,490,000	2,750,000	3,330,000	3,830,000
Terminal Curb Front (l.f.)					
Departure/Enplanement Curb	630	446-527	496-586	599-707	667-788
Arrival/Deplanement Curb	660	100-119	111-131	134-159	149-176
Commercial Median (l.f.)					
Arrivals/Deplanement Curb	660	192-227	213-252	257-304	288-341

Source: ACRP, Project Number 07-04, Spreadsheet Models for Terminal Planning and Design.

VEHICLE PARKING

Vehicle parking associated with the Sunport includes spaces utilized by passengers, visitors, employees, rental car companies, public transit, and taxis/shuttles. Existing parking availability was previously presented on Exhibit 1R. Parking needs are generally established by taking into consideration peak hour passengers, peak hour visitors, and the travel mode split. In accordance with airport parking industry standards, approximately 15 percent of total public parking is identified as short-term parking. The existing and long-term parking needs for the Sunport is shown in **Table 4L**.

TABLE 4L
Vehicle Parking Requirements
Albuquerque International Sunport

	Available	Current Need	Short	Interme-diate	Long	High-Range
Public Parking Requirements						
On-Airport Short-Term Public	3,454	859	879	969	1,171	1,335
On-Airport Long-Term Public	807	4,865	4,983	5,493	6,634	7,564
Total On-Airport Parking	4,261	5,724	5,863	6,462	7,805	8,899
Off Airport Public Parking	6,100					
Total Public Parking	10,361					
Other Parking Requirements						
Employee	872	489	498	550	667	766
Rental Car Ready Return	1,200	600	633	698	844	1,001
Rental Car Service and Storage (acres)	34	13	14	16	19	22
Total All Parking	**12,433**	**6,813**	**6,994**	**7,710**	**9,316**	**10,666**

Note: Analysis assumes no additional off-airport public parking.

The Sunport does not have enough on-airport public parking to accommodate the current need for total parking. As a result, a portion of the public will rely on off-airport public parking options. The combination of on-airport and off-airport public parking provides enough spaces to accommodate forecast growth through the high-range planning horizon.

Employee parking is estimated as 200 spaces per one million enplaned passengers. The current supply of employee parking is adequate through the high range forecast. Rental car parking is consolidated at the rental car facility, which has approximately 1,200 ready/return spaces. Future rental car ready/return needs are calculated at 315 spaces per one million originating passengers. Rental car service and storage space is calculated as seven acres per one million originating passengers. Current rental car facilities are adequate through the high range forecast.

Overall, the combination of on- and off-airport parking is adequate to meet the high range forecast needs of the Sunport. Currently, the parking structure is considered short-term parking, which results in a large supply of short-term parking. Consideration should be given to the functional designation of various parking lots (i.e., short-term, long-term, and employee) in order to accommodate specific needs. For example, a portion of the parking structure could be changed from short-term to long-term parking, if

that was necessary. In addition, parking habits are highly susceptible to factors such as location and price.

AIR CARGO REQUIREMENTS

The primary cargo-related facilities requiring analysis include the cargo apron, sort building space, and landside staging area (delivery truck and vehicle parking). The current air cargo facilities at the Sunport are located to the west of Runway 3-21 in the southwest quadrant of the Sunport. The facilities include a 52,000 square-foot sort/warehouse building constructed in 1992. An 89,700-square-yard cargo apron is available. Ground support equipment (GSE) storage space is located on both the north and south sides of the building and they encompass a total of 19,400 square yards. Truck parking and loading docks encompass approximately 25,000 square yards of space. Building facilities are leased by FedEx, UPS, 10 tanker Air, and Matheson Flight Extenders.

Air Cargo Facility

Estimates of the appropriate size of an air cargo sort facility are based upon national industry standards and range between 1.0 and 2.5 square feet per total tonnage shipped. Generally, 1.0 square foot per ton typically indicates that the facility is more efficiently utilized, and 2.0 square feet per ton typically indicates that the facility has some capacity for near-term growth. Based on current building size and cargo shipped in 2014, the Sunport cargo building maintains a 0.93 building utilization rate. Future space requirements were calculated by multiplying the projected tons shipped and received by a 1.25 utilization rate. Based upon this space calculation, the building will need to be enlarged by 26,804 square feet by the long-term to meet industry utilization standards.

Truck Dock/Staging/Parking Requirements

The existing air cargo building has a total of 30 truck dock positions. Truck dock requirements are based on a planning factor of 0.3 truck docks per 1,000 square feet of building space. No additional docks are necessary through the long-term planning period. Truck parking and staging is currently estimated at 48 percent of the building size at the Sunport. This figure is slightly higher than the national average which is approximately one-third of the building size. Because the nature of air cargo is changing to include a larger percentage of truck deliveries, future estimates for staging and parking utilize the 48 percent factor.

Air Cargo Apron

The cargo apron area requirements are based on the current and projected aircraft type to be utilized in air cargo service at the Sunport. As presented in the Forecasts chapter, total tons shipped are forecast to grow modestly at 0.59 percent annually. The mix of aircraft used in cargo service is not anticipated to change significantly. The DC-10 and A-300 (or similar large jets) are anticipated to remain in the fleet and account for the largest cargo aircraft utilized. Future cargo apron requirements are primarily based

on the type and amount of aircraft utilizing the ramp. The apron should also provide for circulation and access lanes for active GSE.

At the Sunport, there are nine air cargo positions available for large jets and five spaces available for smaller turboprop commuter cargo aircraft. The larger jets generally fall in ADG IV and the turboprops general fall in ADG II. Future cargo apron requirements are estimated at 9,000 square yards per ADG IV jet and 1,000 square yards per turboprop. These calculations include space for active ground service equipment and circulation, which includes the access taxilane and space for the turboprops to pull out without the need for a push-back.

There is a need for additional air cargo building and truck staging/parking area.

Air cargo activities require extensive ground service equipment including cargo lifters, moveable stairs, cargo containers, tug vehicles, and container movement vehicles. While some of this equipment is parked in the vicinity of the aircraft, most is stored to the sides of the cargo building. Following national trends, the space requirements for GSE storage space is estimated at 25 percent of the air cargo building size.

Table 4M presents the requirements needed to fully accommodate air cargo activity at the Sunport. As can be seen, there is a need for additional air cargo building and truck staging/parking area.

TABLE 4M
Air Cargo Requirements
Albuquerque International Sunport

Cargo Element	Available	Current Need	Short	Intermediate	Long
Total Cargo Forecast (in tons)	55,702	55,702	60,043	61,534	63,043
Cargo Building Requirements					
Air Cargo Building (s.f.)	52,000	69,628	75,054	76,918	78,804
Truck Dock Positions	30	21	23	23	24
Truck Staging/Parking (s.y.)	25,000	33,421	36,026	36,920	37,826
Cargo Apron Requirements					
Total Apron Space (s.y.)	89,700	55,000	55,000	64,000	73,000
Ground Support Equipment Space (s.y.)	19,400	13,926	15,011	15,384	15,761

Source: Coffman Associates analysis

GENERAL AVIATION FACILITIES

General aviation facilities are those necessary to accommodate airport activity by all aviation segments except commercial passenger service. This includes recreational flying, business aviation, charter, military, and some portions of air cargo and air ambulance activity. These airport users require a variety of services, such as fueling, terminal services, maintenance, and aircraft storage. The primary components considered for general aviation needs include:

- Aircraft Hangars
- Aircraft Parking Aprons
- General Aviation Terminal Building Services
- Auto Parking and Access

The future need for each of these components has been analyzed based on the aviation demand forecasts.

AIRCRAFT HANGARS

Utilization of hangar space varies as a function of local climate, security, and owner preferences. The trend in general aviation, whether for owners of single or multi-engine aircraft, is toward more sophisticated aircraft (and, consequently, more expensive aircraft); therefore, many aircraft owners prefer enclosed hangar space to outside tie-downs. In a relatively moderate and dry climate such as Albuquerque, many will elect to tie-down their aircraft; however, owners of more expensive aircraft are more likely to utilize hangars.

The demand for aircraft storage hangars is dependent upon the number and type of aircraft expected to be based at an airport in the future; however, hangar construction should be based upon actual demand trends and financial investment conditions. While a majority of aircraft owners prefer enclosed aircraft storage, a number of based aircraft owners may still tie-down outside (due to the lack of hangar availability, hangar rental rates, and/or operational needs). Therefore, enclosed hangar facilities do not necessarily need to be planned for each based aircraft. Currently, approximately 63 percent of based aircraft utilize outside tie-down parking positions. For planning purposes, the percentage of based aircraft owners desiring hangar storage increases progressively up to 77 percent in the long-term.

There are two general types of aircraft storage hangars: T-hangars and conventional hangars. T-hangars are similar in size and will typically house a single engine piston-powered aircraft. Some multi-engine aircraft owners may elect to utilize these facilities as well. There are typically many T-hangar units "nested" within a single structure. There are currently two nested T-hangar structures, one with six units and one with 10 units located on the Sunport.

Conventional hangars are the familiar large hangars with open floor plans that can store several aircraft. It is estimated that there are 80 aircraft parking positions within the conventional hangars at the Sunport.

Table 4N presents aircraft storage needs based on the demand forecasts. Currently, it is estimated that there are approximately 170 tie-down positions, 16 T-hangar positions, and 80 conventional hangar positions. Current and future hangar needs are a function of the existing and forecast based aircraft fleet mix. Future T-hangar positions are estimated at 1,500 sf per unit. Future conventional hangar space is a function of the average space requirement by aircraft type. Single engine piston space is estimated at 1,200 sf, multi-engine piston is estimated at 1,500 sf, turboprops are estimated at 2,400 sf, business jets are estimated at 3,000 sf, and helicopters are estimated at 1,200 sf per space.

T-hangar space is adequate through the long-term planning period. Additional conventional hangar space is needed by the intermediate planning term. By the long-term, an additional 44,300 sf of conventional hangar space is needed.

TABLE 4N
Hangar Storage Needs
Albuquerque International Sunport

			FORECAST			
	Current Supply	Current Need	Short-Term	Inter.-Term	Long-Term	Long-Term Need
Based Aircraft	127	127	135	145	165	
Aircraft to Tie-Down	170	47	44	41	38	
Aircraft to be Hangared	80	80	91	104	127	
T-Hangar Spaces (est.)	16	9	10	13	16	0
Conventional Hangar Spaces (est.)	80	71	81	91	111	31
Total Hangar Spaces (est.)	**96**	**80**	**91**	**104**	**127**	**31**
T-Hangar Area (s.f.)	25,300	13,500	15,000	19,500	24,000	0
Conventional Hangar Area (s.f.)	188,800	145,500	165,600	189,000	233,100	44,300
Total Storage Area (s.f.)	**214,100**	**159,000**	**180,600**	**208,500**	**257,100**	**44,300**

Source: Coffman Associates analysis.

Interviews with management of the FBOs indicate that there is an immediate need for hangars with higher hangar doors. The FBO hangars are currently unable to house aircraft with tails higher than 18 feet. One of the FBOs has indicated a desire to construct additional conventional hangars on the back-apron area (Apron D on Exhibit 1W).

Hangar requirements are general in nature and are based on standard hangar size estimates and typical user preferences. If a private developer desires to construct or lease a large hangar to house one plane, any extra space in that hangar may not be available for other aircraft. The actual hangar area needs will be dependent on the usage within each hangar.

There is an immediate need for hangars with higher hangar doors.

GENERAL AVIATION AIRCRAFT APRON

A general aviation aircraft apron is an expanse of paved area intended for aircraft parking and circulation. Typically, a main apron is centrally located near the airside entry point, such as the general aviation terminal building or FBO facility. Ideally, the main apron is large enough to accommodate transient airport users, as well as a portion of locally based aircraft. Often, smaller aprons are available adjacent to FBO hangars, aviation businesses, and at other locations around an airport. An aircraft parking apron should provide space for the number of locally based aircraft that are not stored in hangars, transient aircraft, maintenance activity, and circulation. The general aviation apron layout at the Sunport follows this typical pattern.

The general aviation apron space consists of several distinct apron areas, all consolidated in the southwest portion of the Sunport. The total usable

The existing general aviation apron at the Sunport is adequate through the long-term planning period.

apron area for aircraft parking is approximately 104,300 square yards of pavement as previously shown on Exhibit 1W.

FAA AC 150/5300-13A, *Airport Design*, suggests a methodology by which transient apron requirements can be determined from knowledge of busy-day operations. Busy day operations were determined by combining general aviation itinerant operations with other air taxi operations that would likely utilize the general aviation apron areas. At the Sunport, the number of itinerant spaces required is estimated at 25 percent of the busy-day itinerant general aviation/other air taxi operations.

A planning criterion of 900 square yards per aircraft was applied to determine current and future transient apron area requirements. This figure is estimated for an average aircraft space requirement and includes circulation apron. There is a current need for 42,600 square yards of transient apron and 47 transient positions. By the long-term, there is a need for 75,900 square yards of apron area and 84 aircraft positions.

Local aircraft tie-down needs are derived from the estimated number of based aircraft which will tie-down. For smaller piston powered aircraft, a planning criterion of 360 square yards was utilized and for larger turboprops, 500 square yards was used. Larger aircraft are assumed to be based in a hangar. There is a current need for approximately 18,200 square yards for total local tie-down apron. By the long-term planning period, there is a need for 16,000 square yards. The forecast decrease in local apron area need is the result of the assumption that more aircraft owners would store their aircraft in a hangar if space were available.

The general aviation aprons are not specifically marked for local and transient parking. In total, it is estimated that there are 104,300 square yards of apron available for these purposes. The total long-term apron area need is estimated at 91,900 square yards. Thus, the existing general aviation apron at the Sunport is adequate through the long-term planning period. **Table 4P** presents the calculated aircraft apron needs for the Sunport.

TABLE 4P
Aircraft Apron Requirements
Albuquerque International Sunport

			FORECAST		
	Current Supply	Existing Need	Short-Term	Intermediate-Term	Long-Term
Transient Apron					
Positions	[redacted]	47	69	74	84
Apron Area (sf)		42,600	62,000	66,400	75,900
Local Apron					
Positions	[redacted]	47	54	51	49
Apron Area (sf)		18,200	17,200	16,400	16,000
Total Apron					
Positions	170	94	123	125	133
Apron Area (sf)	104,300	60,800	79,200	82,800	91,900

Source: Coffman Associates analysis

GENERAL AVIATION TERMINAL SERVICES

The general aviation facilities at the Sunport are often the first impression of the community that corporate officials and other visitors will encounter. General aviation terminal facilities at an airport provide space for passenger waiting, pilots' lounge, pilot flight planning, concessions, management, storage, and various other needs. This space is not necessarily limited to a single, separate terminal building, but can include space offered by fixed base operators (FBOs) and other specialty operators for these functions and services. This is the case at the Sunport, as general aviation terminal space is currently provided by both airport FBOs. The commercial passenger terminal building also provides additional elements, such as restaurants and concessions, if the itinerant passengers so choose to shuttle over to the terminal for those services. It is estimated that there is approximately 46,000 square feet of general aviation terminal service space available at the Sunport.

For larger FBO operations, such as those at the Sunport, a ratio of one square foot for each five square feet of hangar space is used to determine general aviation terminal space requirements. Current general aviation terminal space requirements are met through the long-term planning horizon. Ultimately, each FBO operator will determine their own business need for additional office/general aviation terminal space.

GENERAL AVIATION VEHICLE PARKING

General aviation parking needs are attributable to transient airport users (visitors and employees), locally based users, and aviation businesses. Locally based users primarily include those attending to their based aircraft. Airport businesses need parking to accommodate employees and customers. (Airport business parking needs should be based on the needs of the individual business and are not specifically included in this analysis.)

A planning standard ratio of one vehicle parking space per 1,000 square feet of hangar space us utilized to determine parking needs. **Table 4Q** summarizes this calculation and indicates that the existing parking lot central to the general aviation complex is adequate through the long-term planning period.

The existing parking lot central to the general aviation complex is adequate through the long-term planning period.

TABLE 4Q
General Aviation Terminal Building Space and Parking
Albuquerque International Sunport

			FORECAST		
GA Element	Available	Current Need	Short-Term	Intermediate-Term	Long-Term
Conventional Hangar Area (sf)	188,800	145,500	165,600	189,000	233,100
GA Terminal/Office Area (sf)	46,000	29,100	33,120	37,800	46,620
GA Itinerant Parking Spaces	486	82	98	117	151
GA Local Parking Spaces	110	64	68	73	83
Total GA Parking Spaces	596	146	166	190	234
Total Parking Area (sf)	187,700	45,800	52,200	59,900	73,700

Source: Coffman Associates analysis

GENERAL AVIATION SUMMARY

Exhibit 4L presents a summary of the general aviation requirements. All current elements, except for conventional hangar space, are adequate through the long-term planning period. An additional 44,000 square feet of conventional hangar space is forecast to be needed in the long-term; however, both FBOs have indicated a need for hangars with higher doors to accommodate the higher tail heights of some business jets. As a result, there is an immediate need for this type of hangar. In the Alternatives chapter, locations for additional conventional hangars will be examined.

AIRPORT SUPPORT REQUIREMENTS

Various facilities that do not logically fall within classifications of airside or landside facilities have also been identified. These other areas provide certain support functions related to the overall operation of the airport.

AIRCRAFT RESCUE AND FIREFIGHTING (ARFF) FACILITIES

Part 139 commercial service airports are required to provide Aircraft Rescue and Firefighting (ARFF) services during air carrier operations. The Kirtland Air Force Base Fire Department (KAFB/FD) provides this service through a Memorandum of Agreement, dated August 24, 1984, and the deed transferring the runways to the City of Albuquerque, dated March 16, 1970.

Each certificated airport is required to maintain equipment and personnel based on an ARFF Index established according to the length of aircraft and scheduled daily flight frequency. There are five indices, A through E, with A applicable to the smallest aircraft and E the largest aircraft. The Sunport falls within ARFF Index C, based on an average of five or more scheduled departures per day by large air carrier aircraft with a length between 126 feet and 159 feet (i.e., Boeing 737/757). **Table 4R** presents the vehicle requirements and capacities for each index level.

TABLE 4R
ARFF Index Requirements

Index	Aircraft Length	Requirements
Index A	<90'	1. One ARFF vehicle with 500 lbs. of sodium-based dry chemical or
		2. One vehicle with 450 lbs. of potassium-based dry chemical and 100 lbs. of water and AFFF for simultaneous water and foam application
Index B	90'-126'	1. One vehicle with 500 lbs. of sodium-based dry chemical and 1,500 gallons of water and AFFF or
		2. Two vehicles, one with the requirements for Index A and the other with enough water and AFFF for a total quantity of 1,500 gallons
Index C	126'-159'	1. Three vehicles, one having Index A, and two with enough water and AFFF for all three vehicles to combine for at least 3,000 gallons of agent or

			FORECAST		
	Available (est.)	Current Need	Short Term	Intermediate Term	Long Term
AIRCRAFT STORAGE					
Aircraft to Tie Down	170	47	44	41	38
Aircraft to be Hangared	80	80	91	104	127
T-Hangar Positions	16	9	10	13	16
Conventional Hangar Positions	80	71	81	91	111
Total Hangar Positions	96	80	91	104	127
T-Hangar Area	25,300	13,500	15,000	19,500	24,000
Conventional Hangar Area	188,800	145,500	165,600	189,000	233,100
Total Hangar Area	214,100	159,000	180,600	208,500	257,100

AIRCRAFT APRON					
Transient Apron					
Positions		47	69	74	84
Apron Area (sf)		42,600	62,000	66,400	75,900
Local Apron					
Positions		47	54	51	49
Apron Area (sf)		18,200	17,200	16,400	16,000
Total Apron					
Positions	170	94	123	125	133
Apron Area (sf)	104,300	60,800	79,200	82,800	91,900

GENERAL AVIATION SERVICES					
GA Terminal/Office Space (sf)	46,000	29,100	33,100	37,800	46,600
GA Itinerant Parking Spaces	486	82	98	117	151
GA Local Parking Spaces	110	64	68	73	83
Total GA Parking Spaces	596	146	166	190	234
Total GA Parking Area (sf)	141,000	45,800	52,200	59,900	73,700

		2. Two vehicles, one with Index B and one with enough water and AFFF for both vehicles to total 3,000 gallons
Index D	159'-200'	1. One vehicle carrying agents required for Index A and
		2. Two vehicles carrying enough water and AFFF for a total quantity by the three vehicles of at least 4,000 gallons
Index E	>200'	1. One vehicle with Index A and
		2. Two vehicles with enough water and AFFF for a total quantity of the three vehicles of 6,000 gallons

AFFF: Aqueous Film-Forming Foam
ARFF: Aircraft Rescue and Firefighting
Source: 14 CFR Part 139

KAFB/FD meets ARFF standards required by military aircraft utilizing the facilities at the Sunport which meets ARFF Index E under FAR Part 139. The ARFF Index applicable to the Sunport is anticipated to remain within ARFF Index C; therefore, no changes are needed to maintain an adequate level of fire protection. When any rescue vehicle approaches the end of their useful life, they should be replaced in a timely manner.

SNOW REMOVAL EQUIPMENT

The Sunport is located in an area where snow and ice conditions occur on an infrequent basis with an annual average of approximately 11 inches. The FAA Advisory Circular (AC) 5200-30A, *Airport Winter Safety and Operations*, provides general guidance for snow clearance for commercial service airports. According to the AC, "commercial service airports should have sufficient equipment to clear one inch of snow weighing up to 25 pounds per cubic foot from the primary instrument runway, one or two principal taxiways to the ramp area, emergency or firefighter access roads, and sufficient ramp area to accommodate anticipated aircraft operations." The time that one inch of snow should be cleared is based on the number of annual operations for an airport. The Sunport is in the highest category of over 40,000 annual operations, so the clearance time requirement is one-half hour.

Snow removal equipment (SRE) includes four snowplows with 20-foot blades. Two of the plows also have brooms. These are assigned to the runway and taxiway system. There is also a fifth snowplow with an 11-foot blade assigned to the cargo ramp. The runway/taxiway system is also cleared with a combination blower/broom and a combination blower/loader. Two pickup trucks equipped with 7.5-foot blades and spreaders are used to clear the jetway areas. Another truck carries de-icer for the runway/taxiway system. Three other trucks with 10-foot blades are assigned to both the airfield and the airport roadways. The roadways and parking lots are also cleared with two trucks with 10-foot blades and two pickups with 7.5-foot blades and spreaders. The list of SRE was previously shown in Table 1H.

The current equipment inventory is adequate for the current airfield. Additional equipment could become necessary if airfield and apron pavements are increased significantly.

Snow removal materials storage is currently limited to bins within the airport maintenance building. Standalone storage buildings would increase capacity and loading efficiency.

Table 4S presents the snow clearing priority surfaces. The active air carrier runway and associated taxiways are the highest priorities. ARFF access roads are the next priority, followed by clearing access to Gate F16, which provides access to the airfield for additional equipment if needed.

TABLE 4S
Snow Removal Priority
Albuquerque International Sunport

Airside	Landside
1. Air carrier runway in use and associated taxiways	1. Sidewalks
2. ARFF access roads	2. Terminal roadway system
3. Gate F16 for mutual aid ARFF access	3. Parking structure ramps and roadways
4. Baggage tunnel ramps	4. Other areas as time allows
5. Terminal building apron	
6. South air freight apron	
7. Secondary air carrier runway and taxiways	

Source: Airport Certification Manual

AIRPORT MAINTENANCE FACILITIES

Maintenance facilities are co-located with the SRE facilities in a location between the general aviation area and the air cargo facilities. The maintenance area encompasses approximately three acres and includes three buildings. The maintenance building is a 14,000-square-foot facility with six maintenance bays, a wash bay, parts storage, electrician's shop, paint equipment and paint storage, locker room, restrooms, break room, and offices. The widest overhead door on the building is only 20 feet and there is no lubrication pit. The wash bay is exposed on three sides and is not adequate to wash larger equipment.

The vehicle storage building is approximately 13,100 square feet. It provides heated, enclosed storage for vehicles and de-icing materials. It includes storage bins for sand and urea that are undersized. The building's two overhead doors are located at both ends and are both 20 feet wide. The building is also not conducive to efficient storage of equipment over 25 feet in length.

The third building is a smaller fleet maintenance building of approximately 2,500 square feet on the ground floor and 500 square feet of second floor space. It has three maintenance bays and two-story administrative space. The largest overhead door is just 16 feet wide.

Since the last Master Plan study, de-icing agents and trucks have been relocated to the west side of the terminal area apron.

Because of a lack of space at the consolidated facility, additional equipment is stored in various locations around the airport where space is available.

Previous study has identified a need for additional maintenance and equipment storage space. This included relocating the de-icing materials storage to its own heated enclosure designed for storage and loading. A system of three hoppers, each capable of storing three tons of materials, was recommended.

Additional vehicle storage capable of accommodating the larger vehicles was also recommended. It was determined that a new 24,000-square-foot building could adequately serve the large equipment storage needs. An additional unheated building of approximately 6,000 square feet was also recommended to be able to fully consolidate equipment storage at the site. Unless Part 139 requirements dictate major maintenance or snow removal changes, or airfield pavements change significantly, the additional space discussed above should be adequate for the planning period.

The 1999 Master Plan recommended relocating and consolidating maintenance functions and the snow removal equipment to the east side of Runway 3-21. A key advantage of such a location is that they do not need a public interface and do not need to be located adjacent to any of the major landside components.

FUEL STORAGE

As discussed in Chapter One – Inventory, fuel sales and delivery to aircraft is managed by the private operators on the airport including the FBOs and Aircraft Service International Group (ASIG). There is a total capacity of 1,391,400 gallons of storage capacity for Jet A fuel and 40,700 for AvGas. These totals include the capacity in fuel delivery trucks.

Additional fuel storage capacity should be planned when the Sunport is unable to maintain an adequate supply and reserve. While each fuel retailer determines their own desired reserve, a 14-day reserve is common for AvGas fuel and a seven-day supply is common for Jet A. When additional capacity is needed, it should be planned in 10,000- to 12,000-gallon increments, which can accommodate common fuel tanker trucks that typically have an 8,000-gallon capacity. Fuel storage requirements can vary based upon individual supplier and distributor policies. For this reason, fuel storage requirements will be dependent upon the individual distributors.

Future fuel storage capacity needs are outlined in **Table 4T**. Jet A fuel needs were determined by increasing the 2013 baseline consumption by the forecast average annual growth rate in operations for air carrier, air cargo, and a portion of air taxi operations (0.73 percent). AvGas needs were forecast by increasing the 2013 baseline consumption by the forecast average annual growth rate in operations for general aviation operations (1.11 percent). As can be seen, current fuel storage capacity is adequate through the long-term planning period.

TABLE 4T
Fuel Storage Requirements
Albuquerque International Sunport

	Current Capacity	Baseline Consumption (2013 est.)	Planning Horizon		
			Short-Term	Intermedi-ate-Term	Long-Term
Jet A Requirements	1,391,400				
Annual Usage (gal.)		33,000,000	34,470,000	35,750,000	38,450,000
Daily Usage (gal.)		90,411	94,438	97,945	105,342
7-Day Storage (gal.)		634,615	662,885	687,500	739,423
Avgas Requirements	40,700				
Annual Usage (gal.)		430,000	460,000	490,000	540,000
Daily Usage (gal.)		1,178	1,260	1,342	1,479
14-Day Storage (gal.)		16,538	17,644	18,795	20,712

Projected growth based on operations growth forecast
Source: Airport fuel sales records; Coffman Associates analysis

PERIMETER FENCING

Perimeter fencing is used at airports primarily to secure the aircraft operational area. The physical barrier of perimeter fencing provides the following functions:

- Gives notice of the legal boundary of the outermost limits of a facility or security-sensitive area.
- Assists in controlling and screening authorized entries into a secured area by deterring entry elsewhere along the boundary.
- Supports surveillance, detection, assessment, and other security functions by providing a zone for installing intrusion-detection equipment and closed-circuit television (CCTV).
- Deters casual intruders from penetrating a secured area by presenting a barrier that requires an overt action to enter.
- Demonstrates the intent of an intruder by their overt action of gaining entry.
- Causes a delay to obtain access to a facility, thereby increasing the possibility of detection.
- Creates a psychological deterrent.
- Optimizes the use of security personnel while enhancing the capabilities for detection and apprehension of unauthorized individuals.
- Demonstrates a corporate concern for facility security.
- Limits inadvertent access to the aircraft operations area by wildlife.

The Sunport is served by perimeter fencing that meets standards for Part 139 airports. The fencing serves to provide both operational security as well as a deterrent to wildlife accessing the airfield movement areas. The fencing should be maintained through the planning period.

INFRASTRUCTURE CONSIDERATIONS

STORM SEWER

The *Albuquerque International Drainage Master Plan*, May 1995, analyzed the existing airport storm drainage systems for capacity and discharge flows and volumes. Since the Drainage Master Plan was published, many of the drainage improvements recommended have been accomplished. Most significantly, a drainage diversion was made for the flows generated north of the South General Aviation Area. The historic discharge for storm water flows originating in this area was to the west. In order that the flows at the crossing at University Boulevard and Clark Carr Boulevard could be brought within the crossing's capacity, a portion of the storm water was diverted south of the Sunport through a system constructed during the Runway 3-21 reconstruction project (2002). Other discharge and storm drainage improvements recommended in the Drainage Master Plan have been made as part of construction projects completed since 1995.

There are two remaining portions of the Sunport that have storm drainage improvements recommended in the Drainage Master Plan that have not been accomplished. One area is the portion of the airfield located adjacent to the northern end of former Runway 17-35. The existing storm drainage system capacity is not sufficient just upstream of the discharge point into the 36-inch Gibson Boulevard storm drain. Improvements to this portion of the storm drainage system can be incorporated into the Aviation Center of Excellence ACE development.

The second area with storm drainage problems identified in the Drainage Master Plan that has not yet been remedied begins at the northeast side of the terminal apron. A restrictor plate was installed during the terminal expansion project in the late 1980s because the storm drain downstream does not have the capacity for the flows generated upstream. The restrictor plate causes temporary storm water ponding on the terminal apron during larger storms. Resolution of the capacity problem downstream of the restrictor plate would involve replacing the downstream storm drain with larger pipe.

Downstream of the basin discussed above, the storm drainage discharges into the Kirtland Channel. This is a concrete-lined storm drainage channel located west of Yale Boulevard. During large storm events, the freeboard in the channel is not sufficient to contain the flows. Extension of the freeboard through a portion of the channel should eliminate this problem.

COMMERCIAL POWER

PNM provides primary electrical service to the terminal building and parking structure from Substation #1 via double radial underground distribution feeders identified as feeder 11 and feeder 12. The

terminal and the parking structure are both supported by emergency generators that are switched automatically when the primary power feed fails. Distribution feeder 11 enters the Sunport campus from the east and distribution feeder 12 enters from the west. Both distribution feeders connect to Sunport facilities through power control centers located at different locations in the terminal and parking structure complex. For an individual outage of feeder 11 or feeder 12, PNM can transfer the out-of-service feeder to the remaining in-service feeder via switching facility located outside of the Sunport campus. Furthermore, individual Sunport power control centers can be transferred between feeder 11 and feeder 12.

Emergency generators are also located at several of the power centers and supply enough power to maintain essential facility operations. In the terminal, this includes the public building life safety functions, including lighting, egress, fire pumps, HVAC and other essential power functions.

Most of the jetways at the terminal gates, however, are not powered by emergency generators. The exception is at gates A9-A12 where the jetways have been added to the emergency power circuits during previous expansion projects. No other major capacity issues have been reported on the terminal and parking structure electrical feeds.

Two independent substation sources serve the airfield; Substation #1 via distribution feeder 13 and Substation #2 via distribution feeder 21. Distribution feeder 13 and distribution feeder 21 connect to each of the two City-owned airfield electrical control vaults. The City-owned airfield lighting system is also connected to emergency generators located at each of the two airfield electrical vaults to maintain an operational airfield during severe power outages or shutdowns. All runway lighting and guidance sign circuits are fed by the redundant system. An automatic control system will automatically turn on the selected runway and taxiway lights if there is a failure on either of the PNM primary feeds by selecting the second PNM primary circuit. If both PNM circuits fail, the emergency generators are started and connected to the airfield lighting and guidance sign circuits. Some of the FAA NAVAID installations, such as the Runway 8 and Runway 3 glide slope and ILS, are also included in the redundant power system. There is some excess capacity in the system if additional demand is installed in the airfield lighting system.

SOLAR POWER GENERATION

The Aviation Department has recently installed, through FAA Voluntary Airport Low Emissions (VALE) grants, solar photovoltaic arrays to lessen the electrical power system reliance on commercial generated power through PNM. Most of the 1.0 MW photovoltaic solar power generation infrastructure is located on parking canopies on the fourth level of the parking structure and at the recently reconstructed economy parking lot located north of the parking structure. The photovoltaic arrays power the lighting in the parking structure and feed Power Centers 2 and 3 in the terminal.

NATURAL GAS

The natural gas service to the Sunport is provided by the New Mexico Gas Company, a publicly regulated utility. The existing gas system appears to have adequate supply for the terminal and other facilities at the Sunport. The natural gas system feeds the terminal complex through a main and regulator station located west of the building near the east entrance to the bag tunnel. The Rent-A-Car (RAC) facility is fed from a line in University Boulevard. The general aviation area and the air freight facilities are fed from gas lines in Clark Carr and Spirit Drive.

SPECIFIC AREA REVENUE SUPPORT REQUIREMENTS

As introduced in Chapter One-Inventory, the Sunport owns several property parcels that have been developed or identified for future non-aviation revenue support functions. This section provides a more detailed analysis of these parcels and provides an assessment of their potential uses and benefits to the Sunport. Where appropriate, requirements necessary to bring these parcels into revenue production have been identified. The following parcels are discussed and are identified on **Exhibit 4M**:

- Aviation Center of Excellence
- Sunport Business and Technology Center
- Puerto Del Sol Golf Course
- Property north of Airport Loop Road and west of Girard
- Property located in the northeast corner of Sunport Boulevard and University Boulevard
- Property located in the southeast corner of Sunport Boulevard and University Boulevard
- Property located at the intersection of George Road and University Boulevard
- Yale Landfill – Development Potential

An update to the Albuquerque/Bernalillo County Comprehensive Plan was completed in April 2017.

The city also finished a comprehensive overhaul of the Zoning Code during the preparation of this Sustainable Airport Master Plan. Referred to as the Integrated Development Ordinance (IDO), it is intended to simplify the development process. The update is meant to improve opportunities for economic development and streamline the city's development review and procedures while protecting the city's established neighborhoods and promote sustainable development.

With the exception of Sunport properties 3 and 4, the IDO zoning for the non-aviation/commercial support parcels owned by the Sunport is NR-SU (non-residential, sensitive use). As stipulated in the IDO, "The purpose of the NR-SU district is to accommodate highly specialized public, civic, institutional, or natural resource-related uses that require additional review of location, site design, and impact mitigation to protect the safety and character of surrounding properties."

The Sunport will continue to be regulated by the Sustainable Master Plan, including permissive uses and applicable development standards. ACE and the Business and Technology Center will continue to be regulated by the existing Master Development Plans that currently govern both properties. Existing and future zoning are listed below for the non-aviation land uses listed.

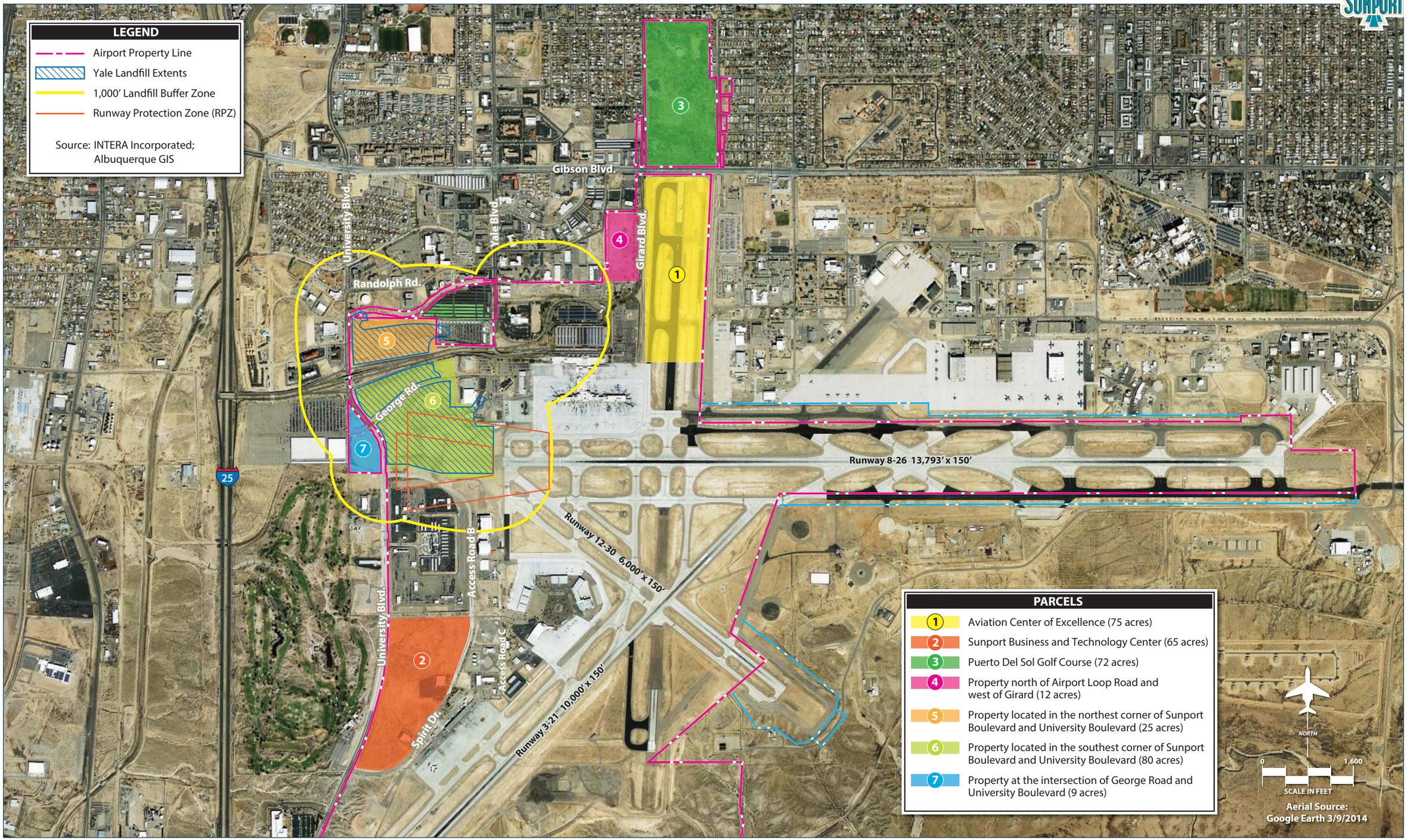


Exhibit 4M
SPECIFIC AREA PARCELS AND YALE LANDFILL

This page intentionally left blank

1. AVIATION CENTER OF EXCELLENCE

Property Size: 75 acres.

Zoning: Previously - SU-1 for Airport and Related Uses. Per the IDO – NR-SU.

Potential Uses: The Aviation Center of Excellence (ACE) is planned to accommodate strategic aviation innovations and partnerships and a variety of users. Development is intended to create an employment center that offers a variety of jobs ranging from entry level to highly skilled. The northern portion of the property along Gibson Boulevard is intended to include commercial retail and service uses. The mid-section of the property is intended to include office and research and development uses. The southern portion of the property is intended to include aviation-related uses, which will not be visible from the public right-of-way. The approved Site Plan for Subdivision provides for a variety of uses and lot lines are shown.

Existing Infrastructure: Water service to the planned ACE development was included in the Site Plan for Subdivision approved by the City of Albuquerque Environmental Planning Commission in 2014. It includes a new 12-inch water main looped to the existing 14-inch main located in the Girard Boulevard corridor. Distribution lines within the ACE development should be designed as individual lots are developed with facilities. The 12-inch distribution main is conceptual in size and approved by the Albuquerque Bernalillo County Water Utility Authority (ABCWUA). A detailed design is recommended when the ACE development progresses.

Sanitary sewer service for the planned ACE development was included in the approved Site Plan for Subdivision and includes new 12-inch sewer mains located at the entry corridors into the ACE. One of the proposed mains will be connected to the existing 12-inch sanitary sewer main located in a corridor running to the west from KAFB and north of the terminal parking structure. The existing 12-inch sewer that extends to KAFB is in poor condition and should be replaced up to the KAFB property line by the new 12-inch main shown in the Site Plan for Subdivision as part of the ACE infrastructure development. A second 12-inch sanitary sewer main was identified in the ACE Site Plan for Subdivision to serve the northern portion of development area. This line will connect to an existing ABCWUA collection main located in Miles Road just west of Girard Boulevard.

Sanitary sewer collection lines within the ACE development should be designed as individual lots are developed with facilities. The 12-inch sewer mains are conceptual in size and approved by the ABCWUA. A detailed design is recommended when the ACE development progresses and when additional information is known about the facility types and uses in the ACE.

Storm drainage management with the ACE property has conceptually been planned to include on-site detention or retention of increase drainage flows resulting from development. The City of Albuquerque recently adopted revisions to the storm drainage ordinances that require treatment of initial flow from new development to protect downstream watershed and controlled waterways from pollutants. In the

case of the ACE development area, retention and filtering of initial flows from the sites could be accomplished as part of the flow management scheme for maintaining historical flows from the site.

Site Development Requirements: The Site Plan for Subdivision for the property was approved in 2014 by the Environmental Planning Commission. Subsequent Site Development Plans for Building Permit for each development project is delegated to the City's Design Review Team (DRT), provided they are consistent with the Site Plan for Subdivision Design Standards. In addition to the City Planning Department's approval process, all buildings, structures, and site plans for projects at the ACE property shall be reviewed and approved by the ACE Architectural Control Committee (ACC).

2. SUNPORT BUSINESS AND TECHNOLOGY CENTER

Property Size: 65 acres.

Zoning: Previously - SU-1 for Airport and Related Uses. Per the IDO – NR-SU.

Potential Uses: The Sunport Business and Technology Center is a designated Foreign Trade Zone (FTZ). The FTZ designation allows companies to bring in raw materials or finished goods, which they can store, assemble, repackage, grade, manufacture, or re-export, without paying duty. Potential uses for the approximately 65-acre site include a wide range of commercial, office, warehouse, manufacturing, hotel/motel and incidental uses, institutional, educational, laboratory, and industrial uses.

Existing Infrastructure: The RAC facility constructed east of University Boulevard, south of Access Road B, is supplied through a water main in University Boulevard and a connected main in Access Road B. The water system is looped through the City mains that run north-south along the west boundary of the Sunport. The South General Aviation Area and Air Freight Cargo Facility and other smaller facilities located in the southern portion of the Sunport property are supplied water through the same mains that serve the new RAC facility. The water supply mains to these facilities were upgraded prior to 2003 and appear to be adequate for the existing development. Water service for development in the Foreign Trade Zone was conceptually planned in the Site Plan for Subdivision approved by the Environmental Planning Commission in 2008.

The RAC facility is served by the City's sanitary sewer system by an 8-inch main located in University Boulevard. The RAC site has a collection system within the development that discharges into the existing main in University Boulevard. The Foreign Trade Zone south of the RAC facility, as well as the south general aviation area, is served by sanitary sewers in Clark Carr Boulevard and Spirit Drive. These systems discharge into mains located in University Boulevard. These facilities are adequately served by the existing system. The collectors in Spirit Drive and University Avenue were designed to accommodate full commercial development along the Spirit Drive corridor.

Site Development Requirements: Future Site Plans for Building Permit will not require a public hearing and are delegated to the City Planning Director, provided they are consistent with the approved Site Plan for Subdivision and Design Standards. At the time of approval of the Site Plan for Subdivision in 2008, the City Aviation Department had concerns about the layout and phased development due to the terrain of the property; therefore, the lot lines, streets, and utility layouts are illustrative. The terrain does not lend itself to phase the project as it is shown and some of the lots may not be able to be developed cost-effectively, but until the time comes when a potential tenant proposes a project, the City's Aviation Department is agreeable to the layout shown on the approved Site Plan.

3. PUERTO DEL SOL GOLF COURSE

Property Size: 72 acres.

Zoning: Previously - SU-1 for Golf Course and Related Facilities. Per the IDO – NR-PO-A, City-Owned or Managed Parks.

Potential Uses: The current zoning for the property allows a golf course and related uses. The existing golf course was created in the 1970s as a buffer for the inbound and outbound flights that utilized Runway 17-35 (ACE project) to the south of the property that is no longer in use. The golf course property had previously been zoned for residential development. Due to this changed condition, the highest and best use of the property eventually may not be a golf course. Other uses, such as housing and/or commercial development along Gibson Boulevard, may be appropriate for the site, but may also be met with opposition from the immediate neighbors and the golfing community.

Existing Infrastructure: In 2005, the Environmental Planning Commission (EPC) approved a Site Plan for Building Permit for a non-potable water storage facility and pump station on an approximately two-acre site within the northeast corner of the Puerto del Sol Golf Course. The tank was approved to further the City's Water Resources Management Strategy (AWRMS) to move the City away from dependence on groundwater. The tank is used to hold non-potable water that irrigates over 700 acres of parks, golf course turf, and green space. As part of the water storage facility pump station development, a pipeline was constructed to the east along Rio Bravo Boulevard and to the north on University Boulevard.

Site Development Requirements: The property is owned by the Aviation Department and operated through a lease/agreement with the City of Albuquerque Parks and Recreation Department. A zone change and associated Site Development Plan to accommodate a use other than a golf course will require going through the City approval process. This would require an application to and hearing before the EPC, which would likely be met with neighborhood opposition.

4. PROPERTY NORTH OF AIRPORT LOOP ROAD AND WEST OF GIRARD

Property Size: 12 acres.

Zoning: Previously - M-1. Per the IDO – NR-LM (non-residential-light manufacturing).

Potential Uses: This property is located just west of the ACE property. As an extension of the proposed uses on the ACE property, the subject land could accommodate similar or compatible manufacturing uses related to aviation.

Existing Infrastructure: Water and electric lines are located just south of the property and can be extended to accommodate future development. Existing utilities are also located within the ACE boundaries. These include water, sanitary sewer, gas, and electric. Future development on the subject site can tap into the existing and proposed infrastructure on the ACE property.

This property is just north of the existing terminal. The existing terminal and parking facilities appear to have sufficient water supply, both for potable use and for fire flow. Any additional facilities constructed in the future may require additional supply lines depending on the size and use of the facility, as well as the location of the new facilities and existing water mains.

The existing terminal and parking facilities are connected to the City sanitary sewer system to an eight-inch sewer on the east side of the facility and an 8-inch sewer on the west side of the facility. Both eight-inch lines connect to a 12-inch main located in Yale Boulevard. The existing sewer lines appear to be adequate for the flows generated from the existing facilities.

Site Development Requirements: The property is governed by the Airport Master Plan and is subject to applicable Federal Aviation Administration Regulations. Development of this property will require a Site Development Plan to be approved by the EPC. Depending on whether there is an end user, a Site Plan for Building Permit could either be processed simultaneously with the Site Plan for Subdivision or be submitted as a follow-up action later by the end user. Once a Site Plan for Subdivision is approved, delegation of future Site Plans for Building Permit could be requested for delegation to the Development Review Board (DRB) for an expedited approval process.

5. PROPERTY LOCATED IN THE NORTHEAST CORNER OF SUNPORT BOULEVARD AND UNIVERSITY BOULEVARD

Property Size: 25 acres.

Existing Zoning: Previously - SU-1 for Airport and Related Uses. Per the IDO – NR-SU.

Potential Uses: This property was the former Yale Landfill (1948-1965) and is located within a designated landfill buffer zone.

Future uses on this site that require the least remediation include a solar farm and parking lot. Solar farm projects will require a Glint and Glare Study to assess the feasibility of this use. These uses will need to address the issue of a continuously settling foundation. Mitigation through dynamic compaction has been determined insufficient by the City of Albuquerque Environmental Health Department.

Existing Infrastructure: The U.S. Post Office, Old Terminal Building, and other facilities located west of the existing terminal building are supplied water from a main that runs north-south from Yale Boulevard to the southern portion of the Sunport. The main was relocated and upgraded during the Sunport Boulevard and Runway 8-26 Reconstruction projects in 1996-1997 and 2009. The old water main alignment crossed the old Yale Landfill and a portion was out of service due to the line breaking from the settling landfill. The new line was relocated out of the landfill and is adequate for the existing facilities that it supplies in this area including the new Snow Barn building being constructed south of the Old Terminal Building.

Developable property lies to the west of the existing facilities and the existing water mains. It is expected that the existing lines would have the capacity for development in this area depending on the type and use of the facilities. Looping the water lines to the water line in University Avenue may be necessary to accommodate development, depending on the type of construction and use of any new facilities. Care should be exercised in locating new lines in the area due to the location of landfill material in this area.

The U.S. Post Office, Old Terminal Building, and other facilities located west of the existing terminal building are connected to the City sanitary sewer system through collectors tied to the Yale Boulevard main. These facilities appear to have sufficient collection through the existing sanitary sewer system. Additional development may require additional capacity in the connector lines depending on the type, use, and location of the facilities.

Site Development Requirements: All development within the landfill buffer is subject to the City of Albuquerque's Interim Guidelines for development within City-designated landfill buffer zones. This requires:

1) Review of a proposed project by the City's Environmental Health Department Environmental Services Division,
2) Input from a professional engineer with expertise in landfills to determine if landfill gas exists on the property, and
3) If landfill gas is present at the subject property, plans for development must include risk abatement measures which are adequate to address any existing or future risk.

These abatement measures must be certified by a professional engineer and signed-off on by designated Albuquerque Environmental Health Services Division staff. (See "Yale Landfill – Development Potential" for additional information).

6. PROPERTY LOCATED IN THE SOUTHEAST CORNER OF SUNPORT BOULEVARD AND UNIVERSITY BOULEVARD

Property Size: 80 acres.

Zoning: Previously - SU-1 for Airport and Related Uses. Per the IDO – NR-SU.

Potential Uses: This property is part of the former Yale Landfill (1948-1965) and is located within a designated landfill buffer zone. Please refer to the heading, Property Located in the Northeast Corner of Sunport Boulevard and University Boulevard, for a brief history of this landfill.

Future uses on this site that require the little to no remediation efforts include a solar farm and parking lot. These uses will need to address the issue of a continuously settling foundation. Mitigation through dynamic compaction has been determined insufficient by the City of Albuquerque Environmental Health Department.

Existing Infrastructure: Please refer to "Existing Infrastructure" as described under the heading, Property Located in the Northeast Corner of Sunport Boulevard and University Boulevard.

Site Development Requirements: Please refer to "Site Development Requirements" as described under the heading, Property Located in the Northeast Corner of Sunport Boulevard and University Boulevard.

7. PROPERTY LOCATED AT THE NORTHEAST INTERSECTION OF GEORGE ROAD AND UNIVERSITY BOULEVARD

Property Size: Nine acres.

Zoning: Previously - SU-1 for Airport and Related Uses. Per the IDO – NR-SU.

Potential Uses: This property is located just west of the Yale Landfill (the two aforementioned properties). While this site was not a former landfill, it is located within a Landfill Buffer Zone. Options for future uses on this site are greater than those available for the properties located in the northeast corner of Sunport Boulevard and University Boulevard. However, this site is subject to special City review due to its location within a Landfill Buffer Zone. Through normal decomposition of buried refuse in former landfills, landfill gases may be produced as a byproduct. Landfill gases may migrate to offsite areas surrounding a landfill. Because of the adjacent landfill, this property will require special consideration of any impact by the former Yale Landfill.

Future uses on this site could accommodate a travel center. A detention pond on the north triangular portion of the property is needed for stormwater purposes.

Existing Infrastructure: Please refer to "Existing Infrastructure" as described under the heading, Property Located in the Northeast Corner of Sunport Boulevard and University Boulevard.

Site Development Requirements: Please refer to "Site Development Requirements," as described under the heading, Property Located in the Northeast Corner of Sunport Boulevard and University Boulevard.

YALE LANDFILL – DEVELOPMENT POTENTIAL

History: The Yale Landfill was operated by the City of Albuquerque from 1948 to 1965. It received residential and commercial waste and did not have a protective liner. The landfill currently has eight monitored wells. Wells are sampled annually. Some contaminants have been detected, but all are below regulatory levels. Methane gas levels on the site are monitored twice a year. Historically, at least three underground fires have occurred which burned for undetermined periods of time. It is believed these areas were flooded with water to extinguish them. These areas were located on the west-central portion of the landfill, near University Boulevard. It is unclear how much, if any, waste was removed for the construction of the original terminal entrance road, the old AMFAC parking lot to the south and east, and the western portion of the parking lot. It is believed that these areas all still have some, if not most, of the original waste under them. Exploration holes showed waste in this area to be around 10 feet deep. In 1988, approximately 400,000 cubic yards of waste were removed for construction of the new Post Office complex, which was located on the east portion of the landfill. From the end of 1995 until the beginning of 1997, approximately 285,000 tons of waste were removed from this landfill for completion of the new Sunport Boulevard terminal access off I-25. During this project, both George Road (formerly Viewpoint Road) and a portion of University Boulevard were relocated, and all waste removed from underneath them and hauled to Cerro Colorado Landfill.

The Yale Landfill site has been fairly well-graded, so no major ponding of water occurs. A good amount of the waste has been removed for construction, so the site slopes rapidly. Therefore, surface water infiltration is not a major problem at this site. In the past, methane gas readings above regulatory levels have been detected.

Development Considerations: In 2014, a Landfill Management Plan (LMP) for the former Yale Landfill was prepared by INTERA, Inc. on behalf of the City of Albuquerque Environmental Health Department (AEHD). The purpose of the LMP is to mitigate risks associated with the decomposition of waste in the unlined landfill. The LMP suggests that any development on the landfill has a significant potential to sustain structural damage from surface subsidence due to waste decomposition. Therefore, careful consideration must be given to historical and current data concerning the distribution of waste, the location of potential subsurface migration pathways, the locations of methane detections, and changes to the surface of the landfill when decisions are made concerning development and required mitigation. All projects requiring waste removal must meet the New Mexico Environmental Department's Solid Waste Division requirements.

Future development on the former landfill must comply with the City of Albuquerque's Interim Guidelines that are highlighted in the property descriptions for sites # 5, # 6, and # 7.

Additional considerations outlined by the LMP are as follows:

1) Potential restriction of any building on buried landfill material (piers or landfill removal).
2) Provision for adequate drainage of surface water runoff away from landfill areas.
3) Prohibition of engineered storm water retention and detention basins over and/or adjacent to landfill materials.
4) Use of landscape practices that require little or no irrigation or providing means of prohibiting irrigation water from infiltrating and reaching buried landfill materials.
5) Removal of landfill material beneath subsurface utilities or adequate design to account for settlement.
6) Adequate design to control the migration of landfill gas away from the landfill and/or off the subject property.
7) Development of landfill gas mitigation measures that are protective of structures, utilities, and personnel.

Landfill Buffer Zone: The Yale Landfill Buffer Zone currently extends 500 feet from the edges of the landfill. The buffer zone width was based upon known facts concerning the landfill, typical patterns of methane gas migration, and potential future scenarios of development on the landfill itself. Currently, there is significant existing development within the buffer zone of the Yale Landfill. Buffer zone development includes hotels, offices, food service, airport parking, and water utilities.

Development Review Process: Site Plans for Building Permit on or within a landfill buffer zone are referred by the City's Planning Department to the City of Albuquerque Environmental Health Department for review. If the development is within a landfill buffer zone, the developer is notified by the Environmental Health Department of the need to comply with the Interim Guidelines, including submittal of a Landfill Gas Assessment Report. The Environmental Health Department then reviews the developer's assessment and may approve the assessment or may request additional effort/design. Once the assessment is complete, the Environmental Health Department will review the plans for mitigation of landfill gas and grant approval once the requirements are met. The Environmental Health Department will continue to communicate with the City's Planning Department to track the current development plans for the area on the Yale Landfill or within the buffer zone.

SUMMARY

This chapter has outlined the facilities required to meet potential aviation demands projected for the Sunport for the next 20 years. The next chapter, Chapter Five - Alternatives, examines potential improvements to the airfield system and the landside area. Most of the discussion focuses on those capital improvements that would be eligible for federal grant funds. Other projects of local concern are also presented on a limited basis. Several facility layouts that meet the forecast demands over the next 20 years are presented in Chapter Five, and an overall ALP that presents a long-term vision will ultimately be developed.

Chapter Five

AIRPORT DEVELOPMENT ALTERNATIVES

ABQ INTERNATIONAL SUNPORT

Sustainable Airport Master Plan

Chapter Five

AIRPORT DEVELOPMENT ALTERNATIVES

In the previous chapter, airfield and landside facilities required to satisfy the projected demand through the long-range planning period were identified. The next step in the planning process is to identify and discuss alternatives for meeting the needs of airport users as well as the mission and vision of the airport sponsor (City of Albuquerque). There are a wide variety of potential development options, so this chapter provides an organized approach to identifying and discussing reasonable alternative development options. The alternatives should be considered unconstrained, meaning reasonable options are first presented and discussed. Factors such as cost and environmental constraints are not weighted heavily at this point as the goal of this chapter is to identify a viable set of alternatives. The alternatives will ultimately be evaluated using a variety of criteria to arrive at a recommended alternative, which will be presented in the next chapter.

The key elements of this planning process are: (1) identification of alternative ways to address previously identified facility requirements; (2) evaluation of the alternatives, individually and collectively, so that planners gain a thorough understanding of the strengths, weaknesses, and other implications of each; and (3) selection of the recommended alternative.

Any development proposed for a Master Plan is evolved from an analysis of projected needs for a set time period (i.e., the 20-year forecasts). Though the needs were determined by utilizing industry accepted statistical methodologies, unforeseen future events could impact the timing of the needs identified. The master planning process attempts to develop a viable concept for meeting the needs resulting

from projected demands for the next 20 years. However, no plan of action should be developed which may be inconsistent with the future goals and objectives of the Sunport. This chapter presents alternatives that could meet the Sunport's development needs to improve the Sunport as a system, while remaining responsive to environmental, fiscal, and other objectives.

The development alternatives for the Sunport can be categorized into two functional areas: the **airside** (runways, navigational aids, taxiways, etc.) and **landside** (hangars, apron, terminal area, support facilities, and vehicle access). Within each of these areas, specific capabilities and facilities are required or desired. Each functional area interrelates and affects the development potential of the others. Therefore, all areas are examined individually then coordinated together to ensure that the final plan is functional, efficient, and cost-effective.

Not all airside or landside elements will require a detailed alternatives discussion, which is intended to present solutions to specific issues. For those airside or landside elements where only one solution is reasonable or where no alternative is necessary, an explanatory narrative is provided.

The information presented in this Alternatives chapter will be presented to the Advisory Committees and the public for comments and input. Based on these comments and input, the project team will evaluate the alternatives and incorporate any relevant information to develop a final recommended airport alternative to be presented in the next chapter.

NO-ACTION/RELOCATION ALTERNATIVES

The City of Albuquerque is charged with managing the Sunport for the economic betterment of the community and region. In some cases, alternatives may include a no-action option; however, for the Sunport, this would effectively reduce the quality of services being provided to the public, affect the aviation facility's ability to meet FAA design standards, and potentially affect the region's ability to support commercial and general aviation needs. The ramifications of a no-action alternative extend into impacts on the economic well-being of the region. If facilities are not maintained and improved so that the Sunport provides a pleasant experience for the visitor or business traveler, or if delays become unacceptable, then these individuals may consider doing business elsewhere. The Sunport also serves as a vital link in the overall National Airport System, which is important for both economic development and national security. The no-action alternative is also inconsistent with the long-term goals of the FAA and the New Mexico Department of Transportation - Division of Aviation, which are to enhance local and interstate commerce. Therefore, an overall no-action alternative is not considered further in this Master Plan. The no-action alternative will be considered in connection with individual elements of the Master Plan to the extent reasonable and feasible.

Likewise, this study will not consider the relocation of services to another airport or development of a new airport site. The development of a new commercial service airport is a very complex and expensive

alternative. A new site will require greater land area, duplication of investment in airport facilities, installation of supporting infrastructure that is already available at the existing site, and greater potential for negative impacts to natural, biological, and cultural resources.

In this Alternatives chapter, various airport elements will be considered for improvement. As indicated above, one alternative for each element may be to take no action. The no-action alternative is then compared to other alternatives. In some cases, the existing condition (no-action alternative) may be the best alternative available. Following review by the Advisory Committees, Sunport staff, and the public, a recommended alternative will be developed; however, the final decision to pursuing development plan(s) rests with the City of Albuquerque and the FAA. The reasons for the selection of the recommended alternative will be clearly documented in Chapter Six – Recommended Master Plan Alternative.

REVIEW OF PREVIOUS PLANNING DOCUMENTS

The Sunport pursues a continuous planning process. On an annual basis, the capital improvement program is updated and adjusted to address development needs for the next five years. Most capital improvement projects, especially those needing federal grant funding assistance, must be depicted on the Airport Layout Plan (ALP). The most current ALP for the Sunport is dated October 2014 and was approved by the FAA on December 16, 2014. The last Master Plan for the Sunport was completed in July 2003.

Exhibit 5A presents the current ALP for the Sunport. Portions of the ALP were updated to address specific changes at the Sunport, including the closure of Runway 17-35 (occurred in 2012), the removal of several buildings, as well as improvements since the last master plan. The ALP reflects many of the future facility needs based on the forecasts of aviation activity identified during the previous Master Plan study, including a replacement terminal building.

The ALP will be updated with this Master Plan process. Some elements depicted on the current ALP may be carried over to the new ALP, while others may need to be adjusted or removed entirely. Nonetheless, it is valuable to reference the current ALP while analyzing various alternative development scenarios.

PLANNING CONSIDERATIONS

Analysis conducted in the previous chapters indicated that various elements of the Sunport need consideration in this Alternatives chapter. The primary issues to be considered are summarized on **Exhibit 5B**. These issues are the result of the findings of the Aviation Demand Forecasts, Demand/Capacity Analysis, and Aviation Facility Requirements.

The primary airfield elements considered include:

- Address Deficiencies to Runway Design Standards (i.e., RSA, ROFA, OFZ, RPZ)
- Mitigate "Hot Spots"
- Mitigate Taxiway Geometry Issues
- Identify Excess/Unjustified Pavement
- Identify Potential Improvements to the Instrument Approaches

The primary terminal complex considerations include:

- Reserve Space for Long Term Terminal Expansion
- Plan Improvements to Ticketing and Bag Screening to Address Changing Needs
- Identify Locations for Concessions Expansion

Other important elements to be considered in the alternatives discussion include:

- Air Cargo Expansion (Sort Building and Truck Staging/Parking)
- Identify Suitable Locations for Additional Conventional Hangars
- Identify Location for Consolidated Maintenance/Snow Removal Equipment Facility
- Present Options for the Highest and Best Use of Airport Specific Parcels

AIRFIELD DEVELOPMENT CONSIDERATIONS

The purpose of this section is to identify and evaluate various airfield development considerations at the Sunport to meet program requirements set forth in Chapter Four. Airfield facilities are, by nature, the focal point of an airport complex. Because of their primary role and the fact that they physically dominate airport land use, airfield facility needs are often the most critical factor in the determination of viable airport development alternatives. The runway system requires the greatest commitment of land area and defines minimum building set-back distances from the runways and object clearance standards. These criteria, depending upon the areas around the airport, must be defined first to ensure that the fundamental needs of the airport are met. Therefore, airside requirements will be considered prior to detailing land use development alternatives.

The issues to be considered in this analysis are summarized on **Exhibit 5B**. These issues are the result of the findings of the Aviation Demand Forecasts, Demand/Capacity Analysis, and Aviation Facility Requirements evaluations, and they include input from the Advisory Committees and Airport staff.

RUNWAY DESIGN STANDARDS

This section considers the RSA, ROFA, OFZ, and RPZ for each runway. Meeting the design standards to the greatest degree feasible is important to protecting the safety of aircraft operations. As noted in Chapter

Meeting the design standards to the greatest degree feasible is important to protecting the safety of aircraft operations.

ULTIMATE RUNWAY DATA [2]

	RUNWAY 3-21	RUNWAY 12-30
	ULTIMATE	ULTIMATE
F.A.R. PART-77 CATEGORY	Precision (3)	Nonprecision (30)
FAR PART-77 APPROACH SURFACES	1,000' x 50,000' x 16,000' (3)	500' x 10,000' x 3,500' (30)
RUNWAY INSTRUMENTATION	Precision (3)	Nonprecision (RW 30)
RUNWAY DIMENSIONS	11,000' x 150'	Same/Existing
RUNWAY SAFETY AREA (RSA)	13,000' x 500'	Same/Existing
RUNWAY OBSTACLE FREE ZONE (OFZ)	11,400' x 400'	Same/Existing
RUNWAY OBJECT FREE AREA (OFA)	13,000' x 800'	Same/Existing
RUNWAY EFFECTIVE GRADIENT	0.10%	Same/Existing

	RUNWAY 3	RUNWAY 21	RUNWAY 12	RUNWAY 30
RUNWAY MARKING	Precision	Same/Existing	Nonprecision	Nonprecision
ELECTRONIC NAVIGATIONAL AIDS	Relocate	Same/Existing	Same/Existing	RNAV GPS
RUNWAY APPROACH VISIBILITY MINIMUMS	1/2 mile	Same/Existing	Same/Existing	1 mile
F.A.R. PART-77 APPROACH SLOPE	50:1/40:1	Same/Existing	Same/Existing	34:1
RUNWAY TOUCHDOWN ZONE ELEVATION (NAVD 88)	5310.6 MSL	Same/Existing	Same/Existing	Same/Existing
RUNWAY VISUAL NAVIGATIONAL AIDS	Relocate	Same/Existing	Same/Existing	Same/Existing

[1] See Existing Runway Data Table for current conditions.
[2] Only design conditions which are proposed to change are depicted in the columns of the Ultimate Runway Data Table.

LEGEND

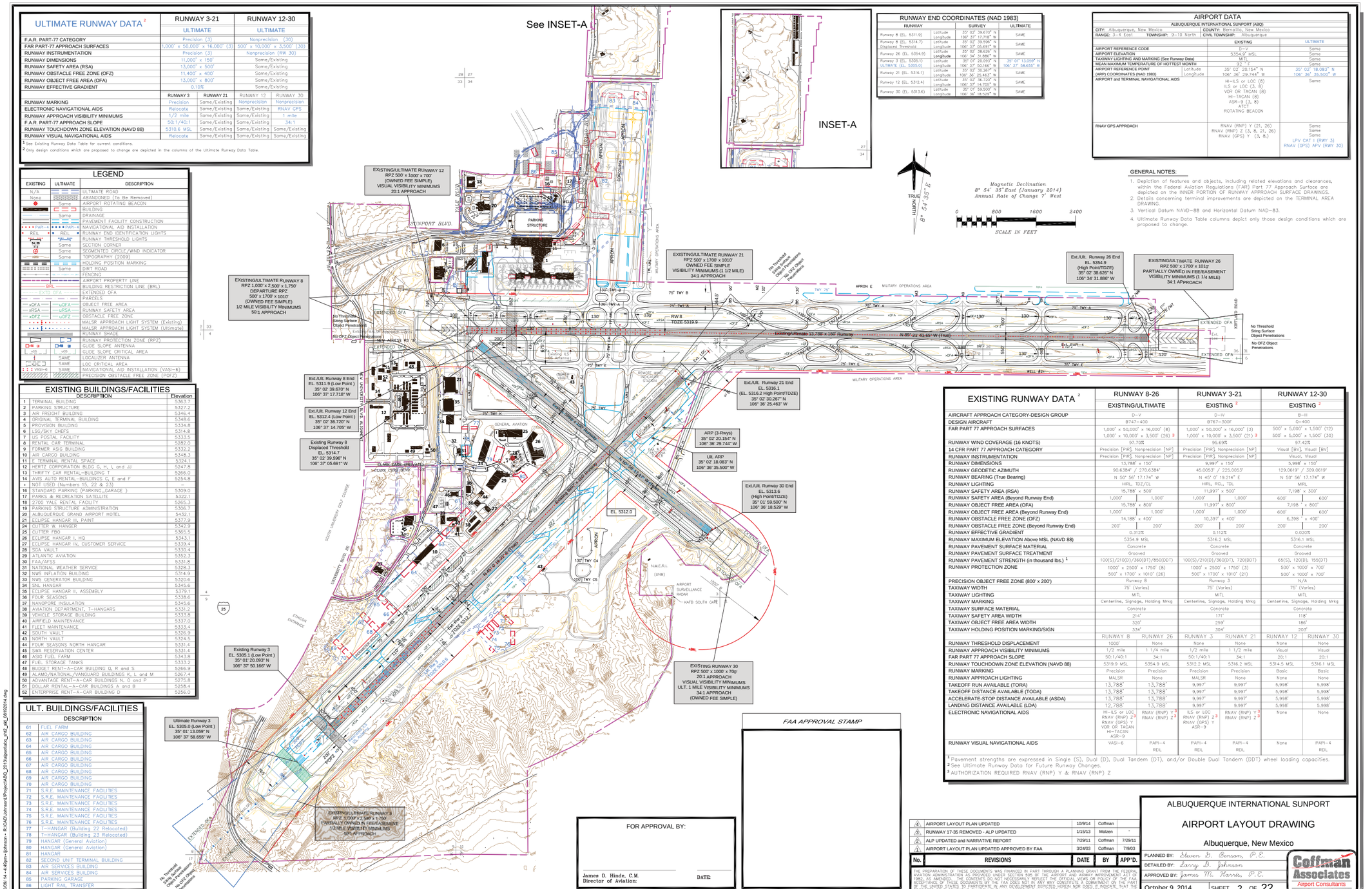
EXISTING	ULTIMATE	DESCRIPTION
N/A		ULTIMATE ROAD
None		ABANDONED (To Be Removed)
Same		AIRPORT ROTATING BEACON
		BUILDING
Same		DRAINAGE
		PAVEMENT FACILITY CONSTRUCTION
PAPI-4	PAPI-4	NAVIGATIONAL AID INSTALLATION
REIL	REIL	RUNWAY END IDENTIFICATION LIGHTS
		RUNWAY THRESHOLD LIGHTS
Same	Same	SECTION CORNER
Same	Same	SEGMENTED CIRCLE/WIND INDICATOR
Same	Same	TOPOGRAPHY (2009)
		HOLDING POSITION MARKING
Same	Same	DIRT ROAD
		FENCING
		AIRPORT PROPERTY LINE
BRL		BUILDING RESTRICTION LINE (BRL)
EXTD OFA		EXTENDED OFA
		PARCELS
xOFA	xOFA	OBJECT FREE AREA
xRSA	xRSA	RUNWAY SAFETY AREA
xOFZ	xOFZ	OBSTACLE FREE ZONE
		MALSR APPROACH LIGHT SYSTEM (Existing)
		MALSR APPROACH LIGHT SYSTEM (Ultimate)
		RUNWAY SHAPE
		RUNWAY PROTECTION ZONE (RPZ)
GS	SAME	GLIDE SLOPE ANTENNA
GSOA	SAME	GLIDE SLOPE CRITICAL AREA
LOC	SAME	LOCALIZER ANTENNA
LOCOA	SAME	LOC CRITICAL AREA
VASI-6	SAME	NAVIGATIONAL AID INSTALLATION (VASI-6)
		PRECISION OBSTACLE FREE ZONE (POFZ)

EXISTING BUILDINGS/FACILITIES

	DESCRIPTION	Elevation
1	TERMINAL BUILDING	5363.7
2	PARKING STRUCTURE	5327.2
3	AIR FREIGHT BUILDING	5346.4
4	ORIGINAL TERMINAL BUILDING	5348.6
5	PROVISION BUILDING	5334.8
6	LSG/SKY CHEF'S	5314.8
7	US POSTAL FACILITY	5333.5
8	RENTAL CAR TERMINAL	5282.0
9	FORMER ASG BUILDING	5332.2
10	AIR CARGO BUILDING	5348.3
11	E. TERMINAL RENTAL SPACE	5324.1
12	HERTZ CORPORATION BLDG G, H, I, and JJ	5247.8
13	THRIFTY CAR RENTAL–BUILDING T	5266.0
14	AMS AUTO RENTAL–BUILDINGS C, E and F	5254.8
-	NOT USED (Numbers 15, 22 & 23)	-
16	STANDARD PARKING (PARKING_GARAGE)	5309.0
17	PARKS & RECREATION SATELLITE	5322.1
18	2700 YALE RENTAL FACILITY	5265.1
19	PARKING STRUCTURE ADMINISTRATION	5306.7
20	ALBUQUERQUE GRAND AIRPORT HOTEL	5432.1
21	ECLIPSE HANGAR III, PAINT	5377.9
24	CUTTER W HANGER	5342.9
25	CUTTER FBO	5365.5
26	ECLIPSE HANGAR I, HQ	5343.1
27	ECLIPSE HANGAR IV, CUSTOMER SERVICE	5339.4
28	SGA VAULT	5330.4
29	ATLANTIC AVIATION	5352.3
30	FAA/AFSS	5331.8
31	NATIONAL WEATHER SERVICE	5328.3
32	NWS INFLATION BUILDING	5314.9
33	NWS GENERATOR BUILDING	5320.6
34	SNL HANGAR	5345.6
35	ECLIPSE HANGAR II, ASSEMBLY	5379.1
36	FOUR SEASONS	5338.6
37	NANOPORE INSULATION	5345.6
38	AVIATION DEPARTMENT, T–HANGARS	5331.2
39	VEHICLE STORAGE BUILDING	5333.8
40	AIRFIELD MAINTENANCE	5337.0
41	FLEET MAINTENANCE	5333.4
42	SOUTH VAULT	5326.9
43	NORTH VAULT	5324.5
44	FOUR SEASONS NORTH HANGAR	5331.4
45	SWA RESERVATION CENTER	5331.4
46	ASG FUEL FARM	5343.8
47	FUEL STORAGE TANKS	5333.2
48	BUDGET RENT–A–CAR BUILDING Q, R and S	5266.9
49	ALAMO/NATIONAL/VANGUARD BUILDINGS K, L and M	5267.4
50	ADVANTAGE RENT–A–CAR BUILDINGS N, O and P	5275.8
51	DOLLAR RENTAL–A–CAR BUILDINGS A and B	5258.4
52	ENTERPRISE RENT–A–CAR BUILDING D	5256.0

ULT. BUILDINGS/FACILITIES

	DESCRIPTION
61	FUEL FARM
62	AIR CARGO BUILDING
63	AIR CARGO BUILDING
64	AIR CARGO BUILDING
65	AIR CARGO BUILDING
66	AIR CARGO BUILDING
67	AIR CARGO BUILDING
68	AIR CARGO BUILDING
69	AIR CARGO BUILDING
70	AIR CARGO BUILDING
71	S.R.E.: MAINTENANCE FACILITIES
72	S.R.E.: MAINTENANCE FACILITIES
73	S.R.E.: MAINTENANCE FACILITIES
74	S.R.E.: MAINTENANCE FACILITIES
75	S.R.E.: MAINTENANCE FACILITIES
76	S.R.E.: MAINTENANCE FACILITIES
77	T–HANGAR (Building 22 Relocated)
78	T–HANGAR (Building 23 Relocated)
79	HANGAR (General Aviation)
80	HANGAR (General Aviation)
81	HANGAR
82	SECOND UNIT TERMINAL BUILDING
83	AIR SERVICES BUILDING
84	AIR SERVICES BUILDING
85	PARKING GARAGE
86	LIGHT RAIL TRANSFER



RUNWAY END COORDINATES (NAD 1983)

RUNWAY		SURVEY	ULTIMATE
Runway 8 (EL. 5311.9)	Latitude	35° 02' 39.670" N	SAME
	Longitude	106° 37' 17.718" W	
Runway 8 (EL. 5314.7) Displaced Threshold	Latitude	35° 02' 39.596" N	SAME
	Longitude	106° 37' 05.691" W	
Runway 26 (EL. 5354.9)	Latitude	35° 02' 38.626" N	SAME
	Longitude	106° 34' 31.886" W	
Runway 3 (EL. 5305.1) ULTIMATE (EL. 5305.0)	Latitude	35° 01' 20.093" N	35° 01' 13.059" N
	Longitude	106° 37' 50.166" W	106° 37' 58.655" W
Runway 21 (EL. 5316.1)	Latitude	35° 02' 30.267" N	SAME
	Longitude	106° 36' 25.463" W	
Runway 12 (EL. 5312.4)	Latitude	35° 02' 36.720" N	SAME
	Longitude	106° 37' 14.705" W	
Runway 30 (EL. 5313.6)	Latitude	35° 01' 59.500" N	SAME
	Longitude	106° 36' 18.529" W	

AIRPORT DATA

ALBUQUERQUE INTERNATIONAL SUNPORT (ABQ)
CITY: Albuquerque, New Mexico | COUNTY: Bernalillo, New Mexico
RANGE: 3–4 East | TOWNSHIP: Albuquerque | CIVIL TOWNSHIP: 9–10 North

	EXISTING	ULTIMATE
AIRPORT REFERENCE CODE	D-V	Same
AIRPORT ELEVATION	5354.9' MSL	Same
TAXIWAY LIGHTING AND MARKING (See Runway Data)	MITL	Same
MEAN MAXIMUM TEMPERATURE OF HOTTEST MONTH	93.7° F	Same
AIRPORT REFRENCE POINT (ARP) COORDINATES (NAD 1983)	Latitude 35° 02' 20.154" N Longitude 106° 36' 29.744" W	35° 02' 18.083" N 106° 36' 35.500" W
AIRPORT and TERMINAL NAVIGATIONAL AIDS	MI–ILS or LOC (8) ILS or LOC (3, 8) VOR OR TACAN (8) MI–TACAN (8) ASR–9 (3, 8) ATCT ROTATING BEACON	Same
RNAV GPS APPROACH	RNAV (RNP) Y (21, 26) RNAV (RNP) Z (3, 8, 21, 26) RNAV (GPS) Y (3, 8,)	Same Same Same LPV CAT I (RWY 3) RNAV (GPS) APV (RWY 30)

GENERAL NOTES:

1. Depiction of features and objects, including related elevations and clearances, within the Federal Aviation Regulations (FAR) Part 77 Approach Surface are depicted on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
2. Details concerning terminal improvements are depicted on the TERMINAL AREA DRAWNG.
3. Vertical Datum NAVD–88 and Horizontal Datum NAD–83.
4. Ultimate Runway Data Table columns deplict only those design conditions which are proposed to change.

EXISTING RUNWAY DATA [2]

	RUNWAY 8-26	RUNWAY 3-21	RUNWAY 12-30
	EXISTING/ULTIMATE	EXISTING [2]	EXISTING [2]
AIRCRAFT APPROACH CATEGORY-DESIGN GROUP	D-V	D-IV	B-II
DESIGN AIRCRAFT	B747–400	B767–300F	D-400
FAR PART 77 APPROACH SURFACES	1,000' x 50,000' x 16,000' (8) 1,000' x 10,000' x 3,500' (26) [3]	1,000' x 50,000' x 16,000' (3) 1,000' x 10,000' x 3,500' (21) [3]	500' x 5,000' x 1,500' (12) 500' x 5,000' x 1,500' (30)
RUNWAY WIND COVERAGE (16 KNOTS)	97.70%	95.69%	97.42%
14 CFR PART 77 APPROACH CATEGORY	Precision [PIR], Nonprecision [NP]	Precision [PIR], Nonprecision [NP]	Visual [BV], Visual [BV]
RUNWAY INSTRUMENTATION	Precision [PIR], Nonprecision [NP]	Precision [PIR], Nonprecision [NP]	Visual, Visual
RUNWAY DIMENSIONS	13,788' x 150'	9,997' x 150'	5,998' x 150'
RUNWAY GEODETIC AZIMUTH	90.6384° / 270.6384°	45.0053° / 225.0053°	129.0619° / 309.0619°
RUNWAY BEARING (True Bearing)	N 90° 56' 17.174" W	N 45° 0' 19.214" E	N 50° 56' 17.174" W
RUNWAY LIGHTING	HIRL, TDZ/CL	HIRL, RCL, TDL	MIRL
RUNWAY SAFETY AREA (RSA)	15,788' x 500'	11,997' x 500'	7,198' x 300'
RUNWAY SAFETY AREA (Beyond Runway End)	1,000' | 1,000'	1,000' | 1,000'	600' | 600'
RUNWAY OBJECT FREE AREA (OFA)	15,788' x 800'	11,997' x 800'	7,198' x 800'
RUNWAY OBJECT FREE AREA (Beyond Runway End)	1,000' | 1,000'	1,000' | 1,000'	600' | 600'
RUNWAY OBSTACLE FREE ZONE (OFZ)	14,188' x 400'	10,397' x 400'	6,398' x 400'
RUNWAY OBSTACLE FREE ZONE (Beyond Runway End)	200' | 200'	200' | 200'	200' | 200'
RUNWAY EFFECTIVE GRADIENT	0.812%	0.112%	0.020%
RUNWAY MAXIMUM ELEVATION Above MSL (NAVD 88)	5,354.9 MSL	5316.2 MSL	5316.1 MSL
RUNWAY PAVEMENT SURFACE MATERIAL	Concrete	Concrete	Concrete
RUNWAY PAVEMENT SURFACE TREATMENT	Grooved	Grooved	Grooved
RUNWAY PAVEMENT STRENGTH (in thousand lbs.) [1]	100(S)/210(D)/360(DT)/850(DDT)	100(S)/210(D)/360(DT), 720(DDT)	65(S), 120(D), 155(DT)
RUNWAY PROTECTION ZONE	1000' x 2500' x 1750' (8) 500' x 1700' x 1010' (26)	1000' x 2500' x 1750' (3) 500' x 1700' x 1010' (21)	500' x 1000' x 700' 500' x 1000' x 700'
PRECISION OBJECT FREE ZONE (800' x 200')	Runway 8	Runway 3	N/A
TAXIWAY WIDTH	75' (Varies)	75' (Varies)	75' (Varies)
TAXIWAY LIGHTING	MITL	MITL	MITL
TAXIWAY MARKING	Centerline, Signage, Holding Mrkg	Centerline, Signage, Holding Mrkg	Centerline, Signage, Holding Mrkg
TAXIWAY SURFACE MATERIAL	Concrete	Concrete	Concrete
TAXIWAY SAFETY AREA WIDTH	214'	171'	118'
TAXIWAY OBJECT FREE AREA WIDTH	320'	259'	186'
TAXIWAY HOLDING POSITION MARKING/SIGN	334'	304'	203'

	RUNWAY 8	RUNWAY 26	RUNWAY 3	RUNWAY 21	RUNWAY 12	RUNWAY 30
RUNWAY THRESHOLD DISPLACEMENT	1000'	None	None	None	None	None
RUNWAY APPROACH VISIBILITY MINIMUMS	1/2 mile	1 1/4 mile	1/2 mile	1 1/2 mile	Visual	Visual
FAR PART 77 APPROACH SLOPE	50:1/40:1	34:1	50:1/40:1	34:1	20:1	20:1
RUNWAY TOUCHDOWN ZONE ELEVATION (NAVD 88)	5319.9 MSL	5354.9 MSL	5312.2 MSL	5316.2 MSL	5314.5 MSL	5316.1 MSL
RUNWAY MARKING	Precision	Precision	Precision	Precision	Basic	Basic
RUNWAY APPROACH LIGHTING	MALSR	None	MALSR	None	None	None
TAKEOFF RUN AVAILABLE (TORA)	13,788'	13,788'	9,997'	9,997'	5,998'	5,998'
TAKEOFF DISTANCE AVAILABLE (TODA)	13,788'	13,788'	9,997'	9,997'	5,998'	5,998'
ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)	13,788'	13,788'	9,997'	9,997'	5,998'	5,998'
LANDING DISTANCE AVAILABLE (LDA)	12,788'	13,788'	9,997'	9,997'	5,998'	5,998'
ELECTRONIC NAVIGATIONAL AIDS	MI–ILS or LOC RNAV (RNP) Z [3] RNAV (GPS) Y VOR OR TACAN MI–TACAN ASR–9	RNAV (RNP) Y [3] RNAV (RNP) Z [3]	ILS or LOC RNAV (RNP) Z [3] RNAV (GPS) Y ASR–9	RNAV (RNP) Y [3] RNAV (RNP) Z [3]	None	None
RUNWAY VISUAL NAVIGATIONAL AIDS	VASI–6	PAPI–4 REIL	PAPI–4 REIL	PAPI–4 REIL	None	PAPI–4 REIL

[1] Pavement strengths are expressed in Single (S), Dual (D), Dual Tandem (DT), and/or Double Dual Tandem (DDT) wheel loading capacities.
[2] See Ultimate Runway Data for Future Runway Changes.
[3] AUTHORIZATION REQUIRED RNAV (RNP) Y & RNAV (RNP) Z

FOR APPROVAL BY:

James D. Hinde, C.M.
Director of Aviation:

DATE:

FAA APPROVAL STAMP

No.	REVISIONS	DATE	BY	APP'D.
4	AIRPORT LAYOUT PLAN UPDATED	10/9/14	Coffman	
3	RUNWAY 17-35 REMOVED - ALP UPDATED	1/15/13	Molzen	-
2	ALP UPDATED and NARRATIVE REPORT	7/29/11	Coffman	7/29/11
1	AIRPORT LAYOUT PLAN UPDATED APPROVED BY FAA	3/24/03	Coffman	7/9/03

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

AIRPORT LAYOUT DRAWING

Albuquerque, New Mexico

PLANNED BY: Steven D. Benson, P.E.
DETAILED BY: Larry D. Johnson
APPROVED BY: James M. Harris, P.E.
October 9, 2014 | SHEET 2 OF 22

Coffman Associates
Airport Consultants
www.coffmanassociates.com

10/09/14 -4:49pm -- ljohnson -- R:\CAD\Johnson\Projects\ABQ_2013\dgnfiles_Misc_ALP_08192014.dwg

This page intentionally left blank

TERMINAL COMPLEX CONSIDERATIONS

- Reserve Space for Long Term Terminal Expansion
- Plan Improvements to Ticketing and Bag Screening to Address Changing Needs
- Identify Locations for Concessions Expansion

LAND USE CONSIDERATIONS

- Present Options for the Highest and Best Use of Airport Specific Parcels

AIRSIDE CONSIDERATIONS

- Mitigate "Hot Spots"
- Mitigate Taxiway Geometry Issues
- Address Deficiencies to Runway Design Standards (RSA, ROFA, OFZ, RPZ)
- Identify Excess/Unjustified Pavement
- Identify Potential Improvements to the Instrument Approaches

LANDSIDE CONSIDERATIONS

- Air Cargo Expansion (Sort Building and Truck Staging/Parking)
- Identify Suitable Locations for Additional Conventional Hangars
- Identify Location for Consolidated Maintenance/ Snow Removal Equipment Facility

Gibson Blvd.
Girard Blvd.
George Rd.
25
HS 1
HS 2
HS 3
HS 4
Runway 8-26 13,793' x 150'
Runway 12-30 6,000' x 150'
Runway 3-21 10,000' x 150'
University Blvd.
Access Road B
Access Road C
Spirit Dr.

NORTH
0
1,600
SCALE IN FEET

Aerial Source:
Google Earth 3/9/2014

Exhibit 5B
PLANNING CONSIDERATIONS

This page intentionally left blank

Three – Facility Requirements, several of the design surfaces extend beyond Sunport property. In several locations, the Sunport has lease or easement rights where these surfaces extend beyond Sunport property. For planning purposes, where the Sunport owns a lease or easement, the design surface is considered in compliance. The following alternatives analysis considers those areas where the design surfaces are not under the control of the Sunport either through ownership, lease, or easement.

Runway 26 Design Standards

Beyond the Runway 26 end, the RSA (1.6 acres), ROFA (4.7 acres), OFZ (0.06 acres) and RPZ (17.6 acres) extend beyond Sunport property and onto KAFB property. KAFB representatives on the Advisory Committees for this Master Plan provided written feedback on this issue. They indicated that KAFB is subject to the Air Installation Compatible Use Zone (AICUZ) Program as outlined in the Air Force Handbook 32-7084. They state, "Kirtland AFB makes every effort to comply with Air Force clear zone and accident potential zone (APZ) requirements in regards to planning or limiting development in these areas." KAFB is also currently in the process of updating their master plan (Installation Development Plan) and they are designating the land under the RPZs and clear zones as "airfield" to further limit development in these areas.

Alternative 1: No-Action

KAFB is also currently in the process of updating their master plan (Installation Development Plan) and they are designating the land under the RPZs and clear zones as "airfield" to further limit development in these areas.

Historically, the agreement between the Sunport and KAFB to protect the design surfaces of the runways has been acceptable to FAA. As a result, the first alternative considered for the design surfaces is a no-action alternative. The portions of the RSA, OFA, OFZ, and RPZs that fall on KAFB property are adequately protected under this agreement. Consideration might be given to memorializing the agreement through a Memorandum of Understanding (MOU) between KAFB and the Sunport.

Alternative 2: Acquire Property

The next option would be for the Sunport to purchase the KAFB land where the RSA, ROFA, OFZ, and RPZ are located (reference Exhibit 4G).

Alternative 3: Acquire Lease/Easement

The third option considered is to do what has been done in other locations at the Sunport, and that is to enter into an agreement with KAFB to lease or obtain an easement for the subject property.

Alternative 4: Shorten Runway

The next option considered is to physically shorten the runway. To bring the full RSA, ROFA, and OFZ onto Sunport property, the runway would have to be shorted by approximately 900 feet. This is not

considered a particularly viable option because the entire runway length is needed to accommodate current activity at the Sunport.

Alternative 5: Runway Shift

Shifting the runway would involve removing 900 feet from the Runway 26 end and adding 900 feet to the Runway 8 end. The RPZ would still extend onto KAFB property. Extending the Runway to the west would have several challenges, including significant terrain drop and construction over the former land-fill (potential settling issues).

Alternative 6: Declared Distances

Declared distances could be implemented which would effectively declare the runway to be shorter for certain operations. Generally, the FAA would prefer to implement declared distances only when other options are not practicable.

Runway 8 RPZ

The approach and departure RPZ beyond the Runway 8 threshold have incompatibilities within them. The north edge of the approach RPZ crosses over the fuel truck refueling station. The RPZ also encompasses a portion of the rental car facility parking lots and car preparation buildings. **Exhibit 5C** presents both the existing condition as well as several alternatives intended to reduce incompatibilities within the RPZ.

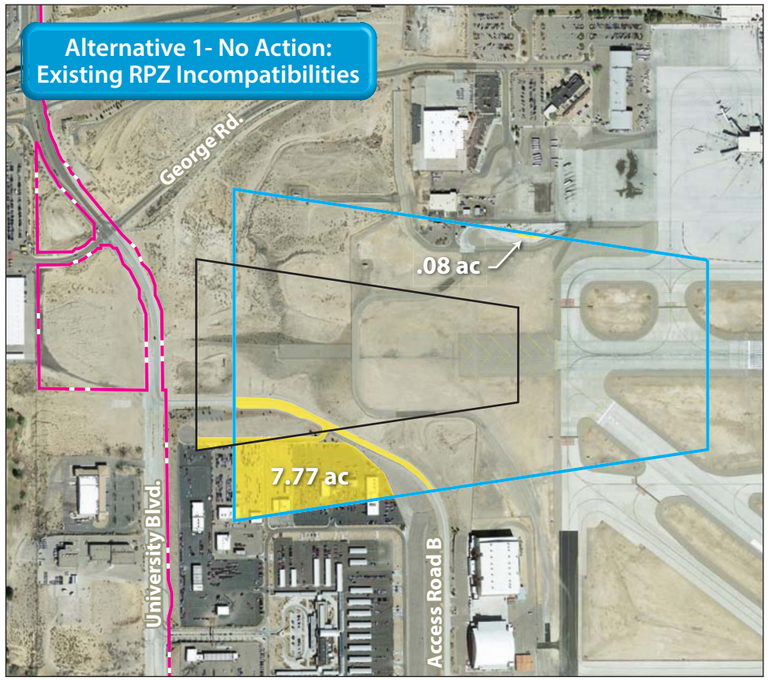
FAA Memo titled, *Interim Guidance on Land Uses Within a Runway Protection Zone*, provides guidance on analyzing new incompatibilities introduced to an RPZ. Typically, new incompatibilities may be introduced as the result of:

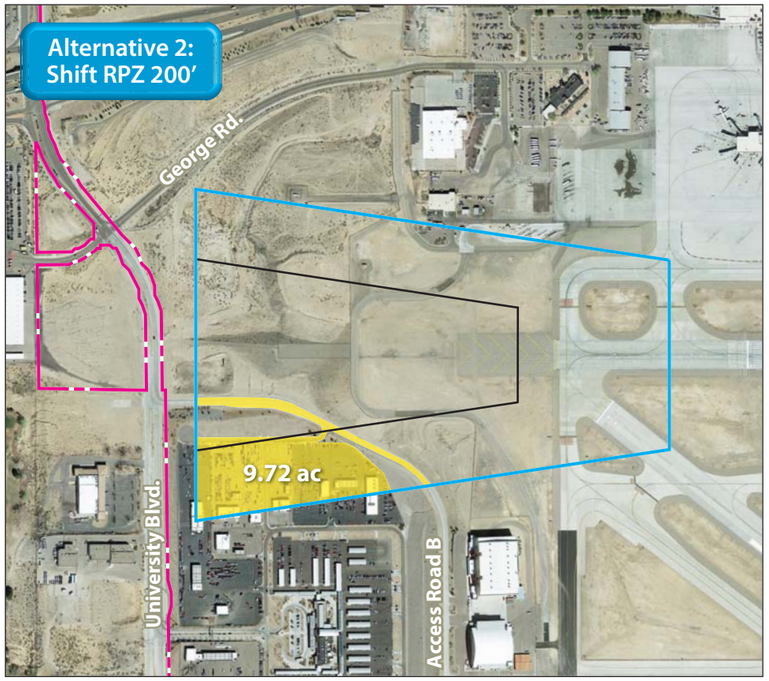
1. An airfield project (e.g., runway extension or shift);
2. A change in the critical design aircraft that increases the RPZ dimensions;
3. A new or revised instrument approach procedure that increases the RPZ dimensions; or
4. A local development proposal in the RPZ (either new or reconfigured).

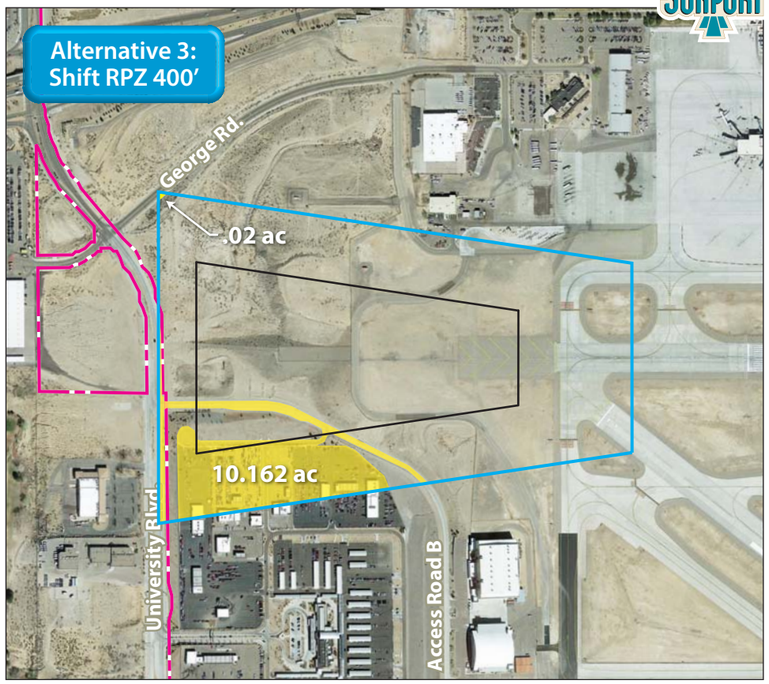
The new guidelines do not apply to existing incompatibilities within an RPZ; instead, the airport sponsor is to continue to pursue remedies following previous guidance. While existing incompatibilities are not technically "grandfathered," it is new incompatibilities that are the primary focus of the *Interim Guidance*. The *Interim Guidance* provides a procedure for analyzing alternatives and requires review and approval of any solution by FAA Headquarters in Washington D.C.

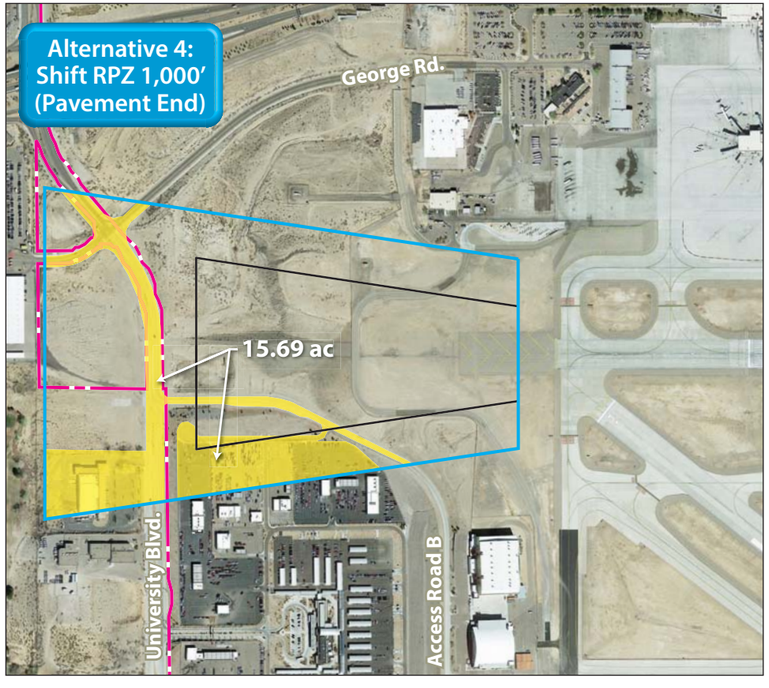
Alternative 1 – No Action

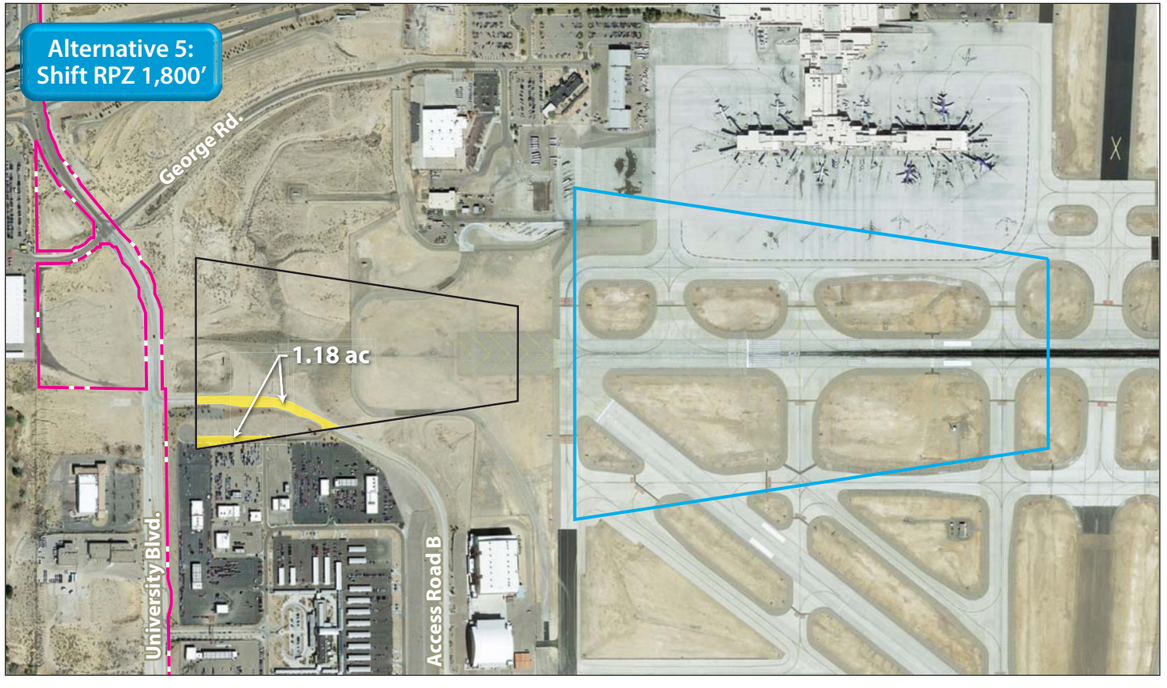
Pursuing a no-action alternative would mean that the existing incompatibilities would remain within the RPZ. One positive consideration is that the incompatibilities are on the outer edges of the RPZ (Controlled Activity Area) and not within the Central Portion of the RPZ (defined by the extended ROFA). The











LEGEND

- Departure Runway Protection Zone (RPZ)
- Approach RPZ
- Incompatible Land

NORTH

0 800

SCALE IN FEET

Aerial Source: Google Earth 3/9/2014

Exhibit 5C
RUNWAY 8 RPZ ALTERNATIVES

This page intentionally left blank

identified incompatibilities are existing and not the result of a change in the size or location of the RPZ. The existing incompatibilities include 0.08 acres covering the refueling station and 7.77 acres over the rental car facilities. It should be noted that the refueling station is connected to an underground piping system and there is no fuel storage at this location.

Alternative 2 – Shift Landing Threshold 200 feet West

Several additional alternatives are considered that are intended to mitigate the existing incompatibilities. Of particular interest to the FAA are alternatives that would remove the refueling station from the RPZ. However, any of the alternatives considered will necessarily trigger the Alternatives Analysis procedure provided in the *Interim Guidance*.

Alternative 2 considers shifting the landing threshold to Runway 8 to the west 200 feet. This would remove the approach RPZ from the stands at the refueling station; however, the refueler queuing area would still be inside the RPZ. It would also increase the area of incompatibilities in the rental car facility. A total of 9.72 acres of incompatible land would be in the RPZ. As noted, this alternative, and any alternative that changes the size or location of the RPZ, would have to be reviewed by FAA Headquarters.

Alternative 3 – Shift Landing Threshold 400 feet West

Alternative 3 considers shifting the landing threshold to Runway 8 to the west 400 feet, which would provide additional separation from the refueling station, although still including much of the queuing area. Incompatibilities in the RPZ would increase to 10.16 acres, including a small portion of University Boulevard.

Alternative 4 – Shift Landing Threshold 1,000 feet West

Alternative 4 considers shifting the landing threshold to Runway 8 to the west 1,000 feet, which would place the threshold at the end of the pavement. While the refueling station would be completely removed, other incompatibilities in the RPZ would increase to a total of 15.69 acres. University Boulevard would traverse the central portion of the RPZ and George Road would be introduced to the controlled activity area of the RPZ. An office building on the west side of University Boulevard would now be encompassed in the RPZ as well.

Alternative 5 – Shift Landing Threshold 1,800 feet East

Alternative 5 considers the possibility of shifting the Runway 8 landing threshold an additional 1,800 feet to the east to completely remove the RPZ from the refueling station. While this action would eliminate RPZ incompatibilities, it would have a significant negative impact on available landing length. It would also reduce the available terminal area apron where the RPZ would cross over. This alternative is primarily depicted to emphasize the impracticality.

Runway 3-21 Design Standards

On the Runway 21 end, a small portion of the RSA (0.1 acre), ROFA (2.5 acres), and RPZ (0.3 acres) extend onto KAFB property. This is much the same situation as exists at the end of Runway 26. A variety of alternatives may be considered including no-action, fee simple acquisition, easement/lease, runway shortening, runway shift, or declared distances. The area of deficiency is clearly dedicated to airside needs; therefore, the potential for an incompatible development is very low.

On the Runway 3 end, the RPZ extends beyond Sunport property. Review of this situation by the Advisory Committee indicated that this land is controlled by the New Mexico Department of Transportation, which owns and maintains Interstate 25 and the adjacent right-of-way easement. As a result, the possibility of a height hazard being installed is quite low and no action is required.

COUPLED RUNWAYS

With the publication of FAA AC 150/5300-13A, *Airport Design*, in 2012, the FAA is making a concerted effort to identify and mitigate coupled runway environments. Coupled runways are those where either the pavements cross or the runway safety areas (RSAs) cross. Most airports with a crosswind runway will have crossing runway environments; however, certain specific geometries should be avoided. For example, safety areas should not overlap because work (maintenance) in one area would affect the operations of both runways. In addition, operations on a runway should not penetrate the critical area of NAVAIDs on the other runway. Configurations where runway thresholds are close together should be avoided, as they can be confusing to pilots, potentially resulting in wrong-runway departures.

There are two locations on the airfield where the runways are coupled. The first is located at Runway 8 and Runway 12 where the thresholds are in proximity and are served by the same threshold taxiways, Taxiways A1 and E1. The runway safety areas of both runways also overlap in this area. This area is also a designated “Hot Spot” and is included in the FAA’s 2016 Runway Incursion Mitigation (RIM) program. Alternatives for this location are presented under the Taxiway “Hot Spot” Mitigation heading below.

The second location is beyond the Runway 21 end where the RSA extends onto Runway 8-26. This location has been the subject of previous action to increase the safety margin. These actions included closure of Taxiway E5 and installation of hold lines on Taxiway A (outside the RPZ for Runway 21) and on Taxiway E. The remaining mitigation measures that may be considered would shorten Runway 21 by at least 365 feet, either through physical pavement removal or through declared distances. Because the current length of the runway is needed to accommodate existing commercial activity, shortening the runway is not considered at this time.

RUNWAY LENGTH

Previous analysis in Chapter Four – Facility Requirements addressed runway length needs at the Sunport. At 13,793 feet in length, Runway 8-26 meets the needs of current users. At 10,000 feet in length, Runway 3-21 also meets the needs of users as a crosswind runway; however, consideration is given to preserving the potential to extend the runway an additional 1,000 feet to the southwest as shown on the current ALP. Runway 12-30 is 6,000 feet long, which meets the needs of the general aviation operators for whom this runway is intended. This length should be preserved to the greatest degree feasible; however, it should be noted that it was determined in Chapter Four - Airport Facility Requirements, that the general runway length needed is 5,500 feet.

RUNWAY WIDTH

All three runways are 150 feet wide. This is the design standard for Runway 8-26 and Runway 3-21. The design standard for Runway 12-30 is 100 feet. There are two primary alternatives available for addressing the width of Runway 12-30:

Alternative 1 – No Action

With this alternative, the width of Runway 12-30 would be maintained at a width of 150 feet. There is a possibility that at the next major rehabilitation/reconstruction, the FAA may not participate in funding beyond 100 feet in width. In this case, the cost to maintain the remaining 50 feet of pavement would be the responsibility of the Sunport.

Alternative 2 – Narrow to 100 feet

This alternative considers narrowing the runway to 100 feet in width at the next major rehabilitation/reconstruction. Narrowing would include moving the runway edge lights in to meet the applicable standard. At that time, a benefit-cost analysis may need to be performed on the alternatives.

HOLD LINE SEPARATION STANDARDS

The hold lines for Runway 8-26 and 3-21 are currently 250 feet from the centerline of the runways. For Runway 12-30 the hold lines are 200 feet from the runway centerline. According to FAA AC 150/5300-13A, *Airport Design*, the hold lines separation distance for all three runways is to be increased based on the elevation of the airport. By current standard, the hold lines for Runways 8-26 and 3-21 should be situated at 304 feet, and for Runway 12-30 they should be at 203 feet.

On November 23, 2004, the FAA approved a modification of standard (MOS) for all hold lines to remain in their existing location. The MOS approval letter from the FAA indicates that relocating the hold lines "could result in insufficient ramp separation and capacity issues."

FAA Order 5300.1G, Modification to Agency Airport Design, Construction, and Equipment *Standards*, establishes the process for initiation, revision, coordination, and management of MOS. All MOS associated with the design standards are valid for no more than five (5) years and they must be reviewed whenever there is an opportunity to meet standards, when situations change, or if a MOS is no longer required. Review of existing MOS is typically undertaken during a master plan project or during planning for a specific capital project that may be impacted by the MOS.

The MOS for the taxiway hold lines was reviewed as part of this master plan study. An in-depth analysis is presented in **Appendix D** and is summarized as follows:

Alternative 1: Rescind the existing MOS and remark all hold lines associated with the runways at the standard distance based on elevation. This action would not address the concerns of the original MOS related to efficiency of ground movements.

Alternative 2: Issue a new MOS which reaffirms the need to maintain the hold lines in their current location. The safety intent of the hold line distance standard based on elevation would be maintained and the critical aircraft would not penetrate the inner-transitional OFZ.

Alternative 3: Issue a new MOS with revisions that identify specific connecting taxiways which can be maintained at a separation of 250 feet. At the very least, the hold lines on Taxiway A1, A2, A1 and C would be maintained at 250 feet from the runway centerline.

TAXIWAYS

The FAA is currently encouraging airports to assess the utility of all airfield pavements. For those pavements with low utilization or available alternate routes, the FAA may withdraw funding support for preservation and/or rehabilitation reserving limited grant funds for pavements with higher utilization rates. Under these cases, it would fall to the airport to either pay for pavement upkeep or to ultimately close the pavement.

Taxiway Exits for Runway 8-26

Exhibit 5D presents an analysis of the current exit taxiways serving Runway 8-26. The exhibit shows the distance from the landing threshold to the exit taxiway in both directions. FAA AC 150/5300-13A, *Airport Design*, presents a methodology to assess the utilization percentages for taxiway exits based on location. The methodology considers both right-angled and acute-angled exits (which typically have a higher utilization rate for larger aircraft) and presents an approximate percentage of the large aircraft and heavy aircraft fleet that would be able to exit under both wet and dry conditions. **Table 5A** shows the exit percentages in table format. As can be seen from the exhibit and the table, some utilization will be lost if any taxiways serving the central portion of Runway 8-26 (Twy A5-A9 and E6-E9) were to be closed.

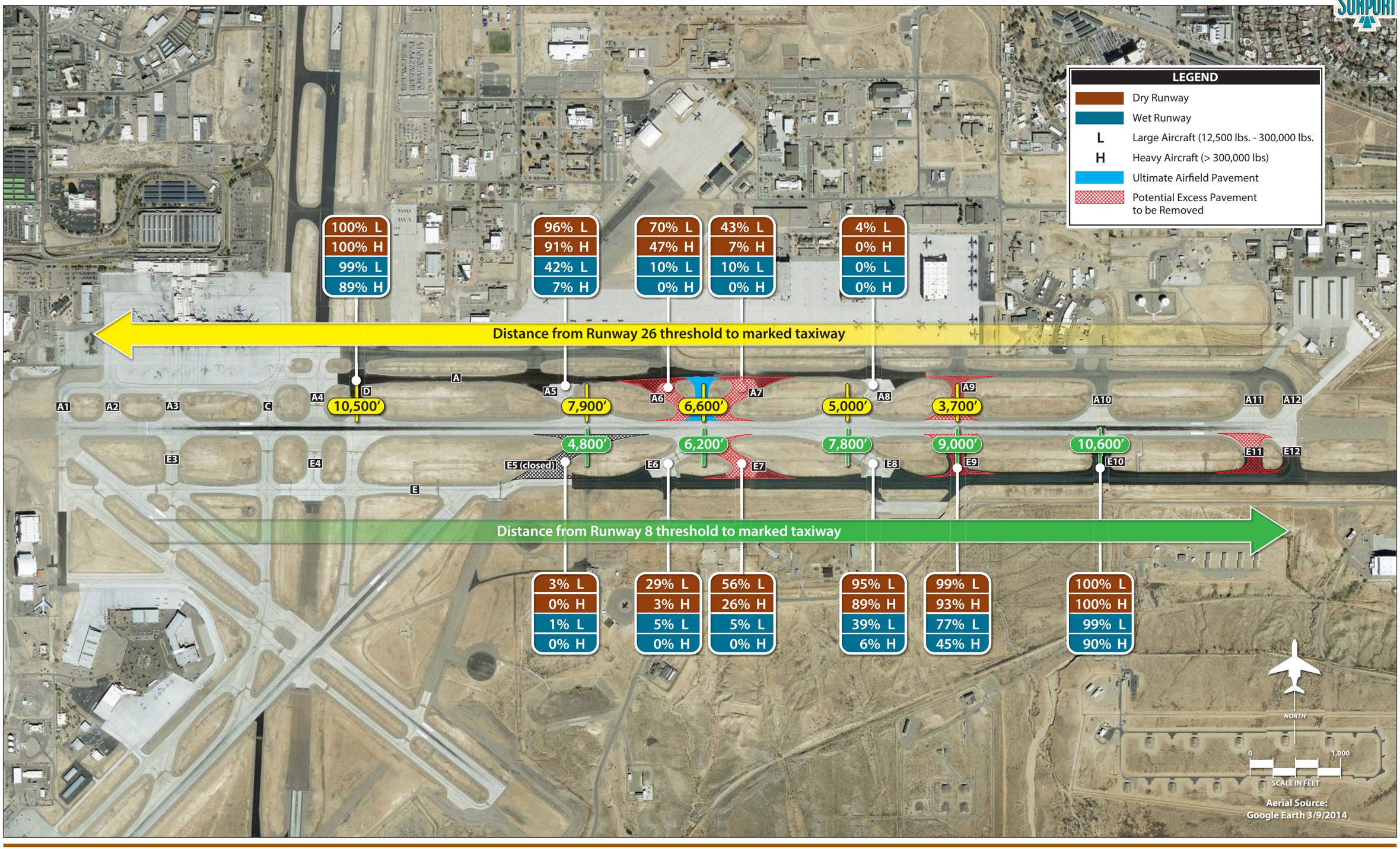


Exhibit 5D
TAXIWAY EXIT ANALYSIS

This page intentionally left blank

TABLE 5A
Taxiway Exit Utilization Percentage
Albuquerque International Sunport

Runway Condition	Wet Runways		Dry Runways			
Taxiway Type	Right and Acute Angled Exits		Right Angled Exit		Acute Angled Exit	
Aircraft Type	Large	Heavy	Large	Heavy	Large	Heavy
LANDING RUNWAY 8						
Twy E5 (Closed)/Twy A5	1	0	3	0	11	0
Twy E6 & E7/Twy A6 & A7	5	0	29	3	56	26
Twy E8/Twy A8	39	6	84	50	95	89
Twy E9/Twy A9	77	45	99	93	100	100
Twy E10/Twy A10	99	90	100	100	100	100
LANDING RUNWAY 26						
Twy A9/Twy E9	0	0	0	0	0	0
Twy A8/ Twy E8	0	0	4	0	16	1
Twy A7 & A6/Twy E7 & E6	10	0	43	7	70	47
Twy A5/ Twy E5 (closed)	42	7	87	57	96	91
Twy D	99	89	100	100	100	100

Note: Adjustment made for Sunport elevation of 5,355 feet MSL
Large Aircraft: Those between 12,500 and 300,000 pounds.
Heavy Aircraft: Those greater than 300,000 pounds.
Source: FAA AC 150/5300-13A, Airport Design; Coffman Associates analysis.

On the north side of Runway 8-26, Taxiways A6 and A7 are considered for closure and replacement with a single right-angled taxiway exit. The existing layout of these taxiways does not meet current taxiway design standards which recommend that acute-angled taxiways not meet in the same location. Taxiway A9 is also considered for closure for two primary reasons: 1) it allows direct access from the KAFB apron to the runway, and 2) it provides limited benefit for aircraft exiting the runway. Ninety-five (95) percent of large aircraft landing on Runway 8 can generally exit prior to or at Taxiway A8. That percentage increases to 99 percent when utilizing Taxiway A9. Therefore, the presence of Taxiway A9 only increases the exit percentage of large aircraft by four percent. For heavy aircraft, the exit percentage increases from 89 percent to 93 percent.

On the south side of Runway 8-26, Taxiway E7 is considered for closure. Taxiways E7 and E6 intersect at the runway, thus violating current design standards. This is the same non-standard taxiway layout as Taxiways A6 and A7. To solve this issue, Taxiway A7 is considered for closure. Once Taxiway E7 is closed, Taxiways E6 and E8 would become the primary exits on the south side of the runway. It is estimated that 29 percent of large aircraft could utilize Taxiway E6 and 95 percent could utilize Taxiway E8.

Taxiway E9 is also considered for closure. It only provides a four percent improvement for exit percent. Nearly all aircraft landing on Runway 8 are able to exit prior to Taxiway E9. Taxiway E11 is also considered for closure. This is a bypass taxiway that is rarely utilized. Most aircraft that would need a bypass taxiway to depart on the Runway 26 end would utilize Taxiway A on the north side of the runway. Thus, bypass Taxiway A11 is considered to remain viable, while Taxiway E11 is considered for closure.

Excess Taxiway Pavement

Exhibit 5E presents an aerial of the airfield with several taxiways and other pavement areas shown for closure consideration. Taxiways A4 and E4 are remnants of closed Runway 17-35. These two taxiways are close to Taxiways C and D, which provide the same north/south access. Consideration is given to closing Taxiways A4 and E4.

Consideration is given to the closure/alteration of several existing taxiways that may be redundant and/or unnecessary. Taxiway J is a partial parallel taxiway to Runway 12-30. Its main function is to provide a third access route to the terminal apron in addition to Taxiways C and D. Taxiway J also intersects Taxiways E and E3 to form a wide expanse of pavement in violation of the three-node concept. By removing Taxiway J, this intersection becomes more intuitive for pilots.

The south end of Taxiway H intersects with Runway 12-30 at an angle. The primary function of Taxiway H is to provide military aircraft with access to hot pad number three. It is rarely utilized to access Runway 12-30. Consideration is given to closing that portion of Taxiway H south of military hot pad number three.

Taxiways A2, A3, and C allow for direct access from the terminal apron to Runway 8-26 in violation of current taxiway design standards. To address this layout, the Sunport has painted a yellow and black dashed line that segregates the taxiways from the terminal apron. This marking is effective in that there have been no incursions in this area to date. Nonetheless, as part of a master plan, it is important to examine other options that would further reduce the potential for an incursion.

One option to consider is closing Taxiways A2, A3, and C between the terminal apron and the runway, but this could potentially lead to significant congestion for aircraft taxiing into and out of the terminal area. A second option is the installation of apron "islands" that would force pilots to make a turn onto parallel Taxiway A prior to turning again to enter the runway environment. The "islands" would have to be large enough to be properly signed and marked as non-movement areas. The "islands" can be created with markings or by physically removing portions of the apron pavement.

TAXIWAY "HOT SPOT" MITIGATION

The FAA has identified four hot spots on the airfield where the potential for runway incursions is considered high. These hot spots were previously identified and discussed in Chapter Four - Facility Requirements and on **Exhibit 4H**. There may be a wide range of potential solutions for hot spots. In some cases, geometric solutions (i.e., relocating or removing pavement) may be considered, while in others simply improving signage can help increase pilot situational awareness. In some cases, the best hot spot solution may be to take no action because viable alternatives might make the layout even more confusing.

Hot Spot 1 Alternatives

Hot Spot 1 is located at the intersection of Runway 8 and Runway 12. The hold lines on Taxiway A1 and E1 are the hold lines for entry to both runways leading to the potential for a pilot to line up and takeoff from the wrong runway. **Exhibit 5F** presents the potential alternatives to mitigate this hot spot.

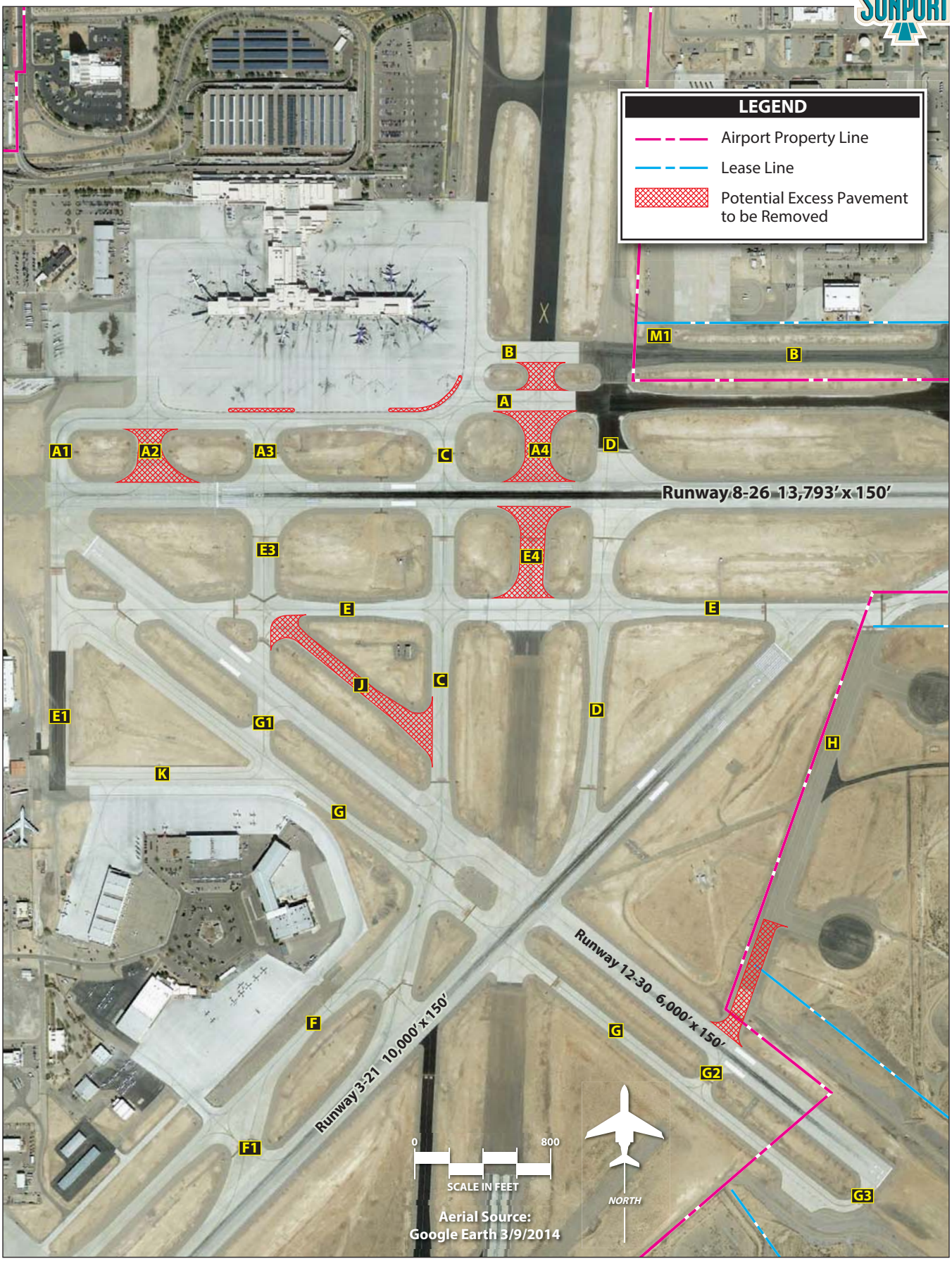


Exhibit 5E
POTENTIAL EXCESS PAVEMENT

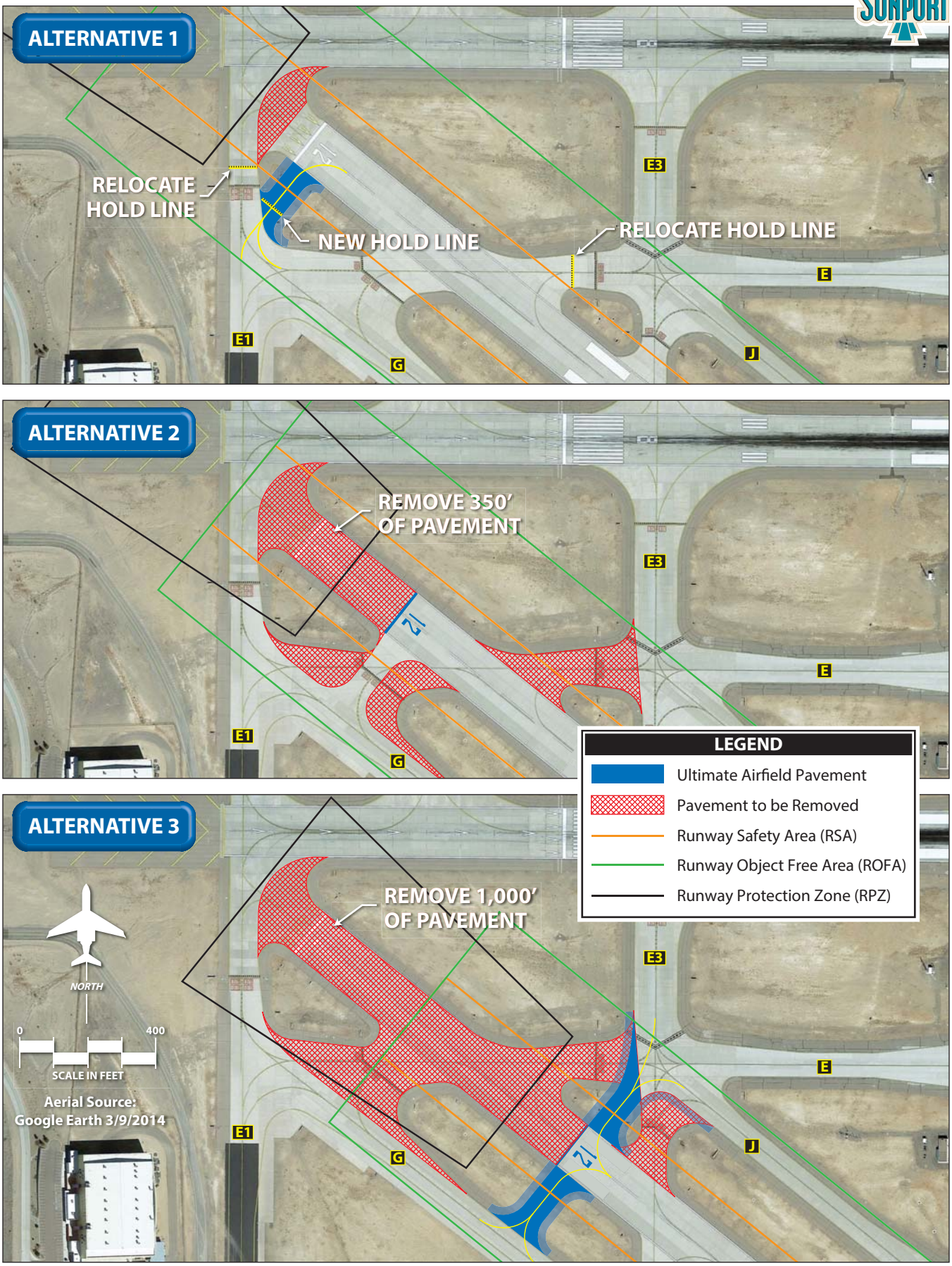


Exhibit 5F
HOT SPOT 1 ALTERNATIVES

Hot Spot 1 Alternative 1

The first alternative considered is to close the pavement that leads directly to the Runway 12 threshold. A new Runway 12 threshold taxiway is then planned to provide the more typical 90-degree entrance to the runway. This option would force users of Runway 12 to make a more typical entrance to the runway and would remove the possibility of a pilot lining up on the wrong runway.

One potential negative to this solution is the introduction of a new taxiway to an already wide expanse of pavement created by the intersection of Taxiways E, E1, and G. Nonetheless, the existence of the wide expanse of pavement may be preferable to the hot spot concern.

Hot Spot 1 Alternative 2

The second alternative considers shifting the threshold of Runway 12 approximately 350 feet and constructing a new threshold entrance taxiway. This would require shortening the runway to 5,650 feet in length. Portions of Taxiway E would be planned to be removed, which would disrupt the full parallel nature of the taxiway. The pavement removal would have the benefit of reducing the existing wide expanse of pavement at the intersection of Taxiways E, E1, and G.

Hot Spot 1 Alternative 3

A third alternative considered is to shift the Runway 12 threshold 1,000 feet so that the threshold taxiway entrance can be clear of the intersection with Taxiway E. This also would also completely decouple the RSAs of both runways. There are several challenges to this alternative. It would shorten the runway to 5,000 feet, which is less than what is required. Additionally, that portion of Taxiway E between Taxiways E1 and E3 would be removed because it would traverse the RSA behind the Runway 12 end, which is not proper design for a taxiway that goes around a runway end.

Hot Spot 2 Alternative

Taxiway G and G1 are adjacent to the general aviation apron. Pilots must be alert so as to not inadvertently enter Runway 12-30. The geometry of this area also allows for direct access from the general aviation apron area to the runway. **Exhibit 5G** presents alternatives to mitigate hot spot 2.

Hot Spot 2 Alternative 1

This alternative considers closing/removing Taxiways G1 and E3 and replacing them with a crossing taxiway that is perpendicular to Runway 12-30. By doing this, pilots will no longer be able to traverse directly from the general aviation apron into the Runway 12-30 environment. This alternative also includes the potential removal of that portion of Taxiway E3 between Taxiway E and Runway 12-30 because this pavement would likely be underutilized since most general aviation aircraft landing on Runway 30 would be exiting to the south. Taxiway J is also shown as excess pavement in this alternative.

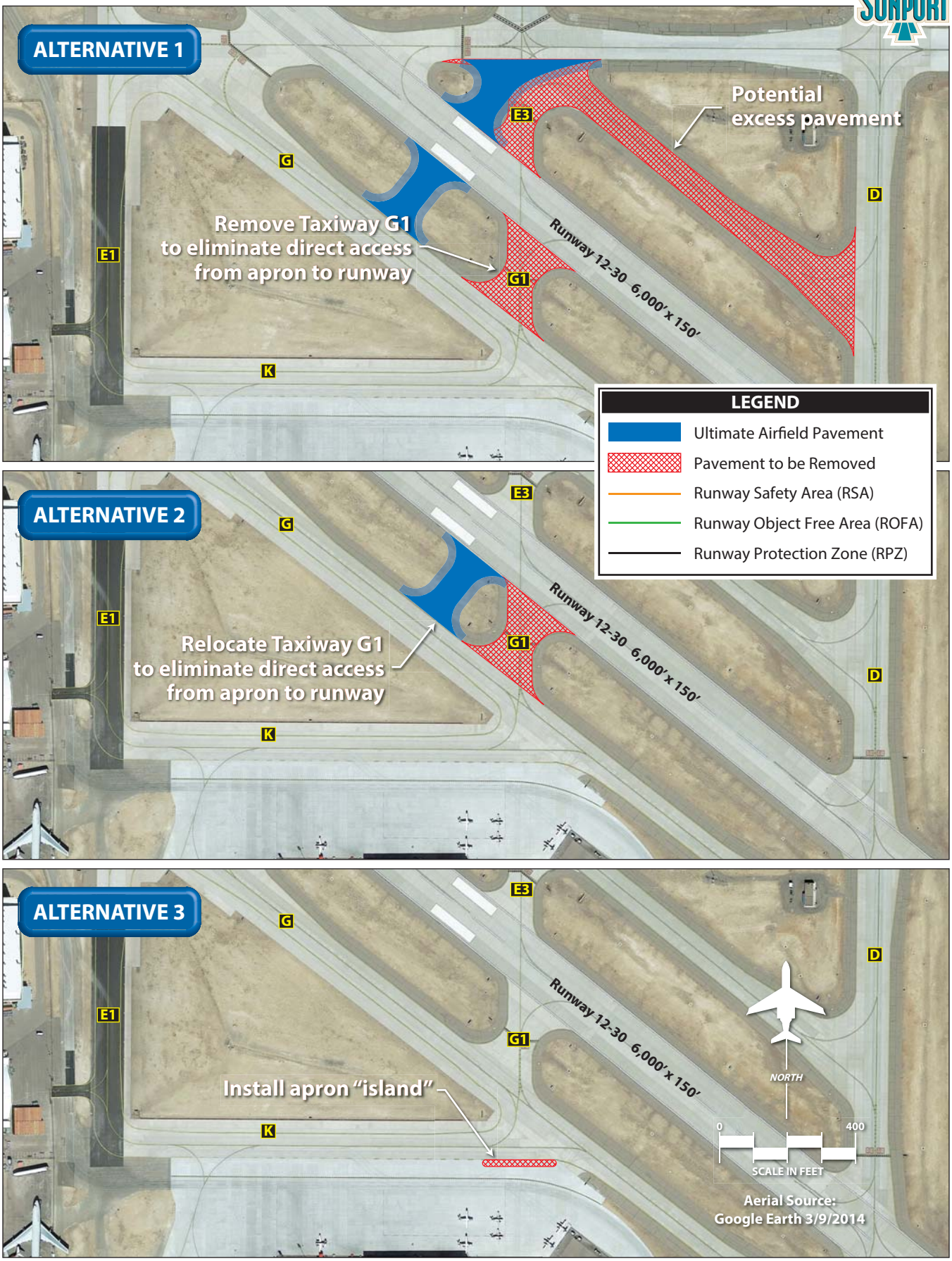


Exhibit 5G
HOT SPOT 2 ALTERNATIVES

Hot Spot 2 Alternative 2

This alternative considers shifting the location of Taxiway G1 slightly to the east, which would have the effect of eliminating the direct access issue. In this layout, Taxiway E3 is planned to remain, allowing for continued runway crossing movement as necessary. While this geometry does eliminate the direct access concern, pilots intending to cross the runway would have to make a slight turn on the runway to access the taxiway on the other side.

Hot Spot 2 Alternative 3

A third option is to install an apron "island" that would force pilots to turn onto Taxiway G prior to then turning on Taxiway G1. The "island" will need to be large enough to accommodate proper signage and non-movement area markings.

Hot Spot 3 Alternatives

This hot spot has the convergence of three taxiways (C, G, and F) and Runway 12-30. Pilots must be alert for the hold short line for Runway 3-21. The issue is primarily the wide expanse of pavement and the convergence of three taxiways and a runway in violation of the three-node concept, all of which could be confusing to pilots. At the same time, each of these taxiways is highly utilized, and two of them are parallel or partial parallel taxiways to their associated runway.

This intersection provides ready access to the terminal area via Taxiway C for commercial aircraft landing on Runway 3. Operational information indicates that many commercial flights landing to Runway 3 will exit on acute angled Taxiway C and proceed across Taxiway G toward the terminal area. This is what one might refer to as a straight shot to the terminal area. To facilitate this movement, it is common for the ATCT personnel to hold activity on Runway 12-30 until the landing aircraft crosses the runway via Taxiway C. **Exhibit 5H** presents three potential alternatives to mitigate this hot spot.

Hot Spot 3 Alternative 1

The first alternative considered is to convert Taxiway C (between Runway 3-21 and Taxiway F) from an acute-angled exit to a right-angled exit. The purpose of this layout is to force pilots to make a turn onto Taxiway F. This movement would potentially increase pilot situational awareness and give them a little more time to assess the upcoming intersection. This alternative does not solve the wide expanse of pavement issue, but it would slow aircraft and provide additional time for pilots to acclimate to the intersection.

The exhibit shows the utilization percent of Taxiway C (between Runway 3-21 and Taxiway F) by both large and heavy aircraft. Under wet conditions, regardless if the exit is right- or acute-angled, approximately 15 percent of large aircraft and zero percent of heavy aircraft can exit. Under dry conditions and a right-angled exit, approximately 55 percent of large aircraft and 12 percent of heavy aircraft can exit.

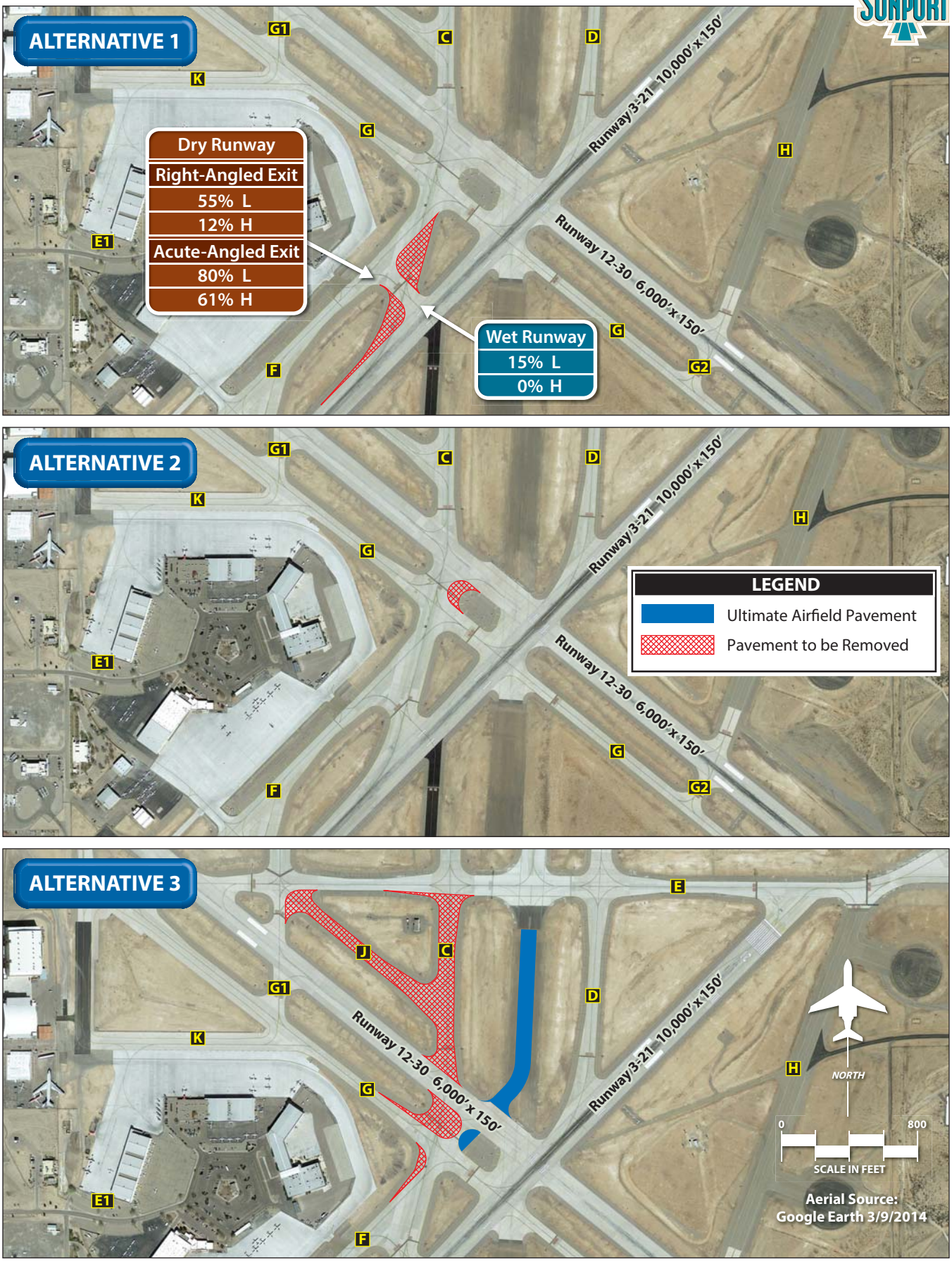


Exhibit 5H
HOT SPOT 3 ALTERNATIVES

This utilization percent is significantly lower than the existing acute-angled exit provides with 80 percent for large aircraft and 61 percent of heavy aircraft.

Hot Spot 3 Alternative 2

The next alternative is a modest alteration to the pavement layout which considers removing the wide portion of Taxiway C between Taxiway G and Runway 12-30. This alteration would reduce the width of Taxiway C in this location to near the 75-foot standard. It is likely the taxiway fillet would have to be somewhat wider to continue to allow an aircraft travelling south of Taxiway C to turn east onto Taxiway G. This alternative would eliminate the acute-angled exit currently available for aircraft landing on Runway 30. In some cases, aircraft may have to continue to roll out to Taxiway G1 or the end of the runway.

Hot Spot 3 Alternative 3

The next alternative would bring the intersection up to standards; however, would be a much larger project in terms of cost and scope. Taxiway F would be extended parallel to Runway 3-21 across Taxiway G and Runway 12-30. At the point where it reaches the former Runway 17-35, it would angle north to connect with Taxiway E4, thus providing access to the terminal area. This alternative would create two standard three-node intersections: one with Taxiway F and Taxiway G, and one with Taxiway F and Runway 12-30.

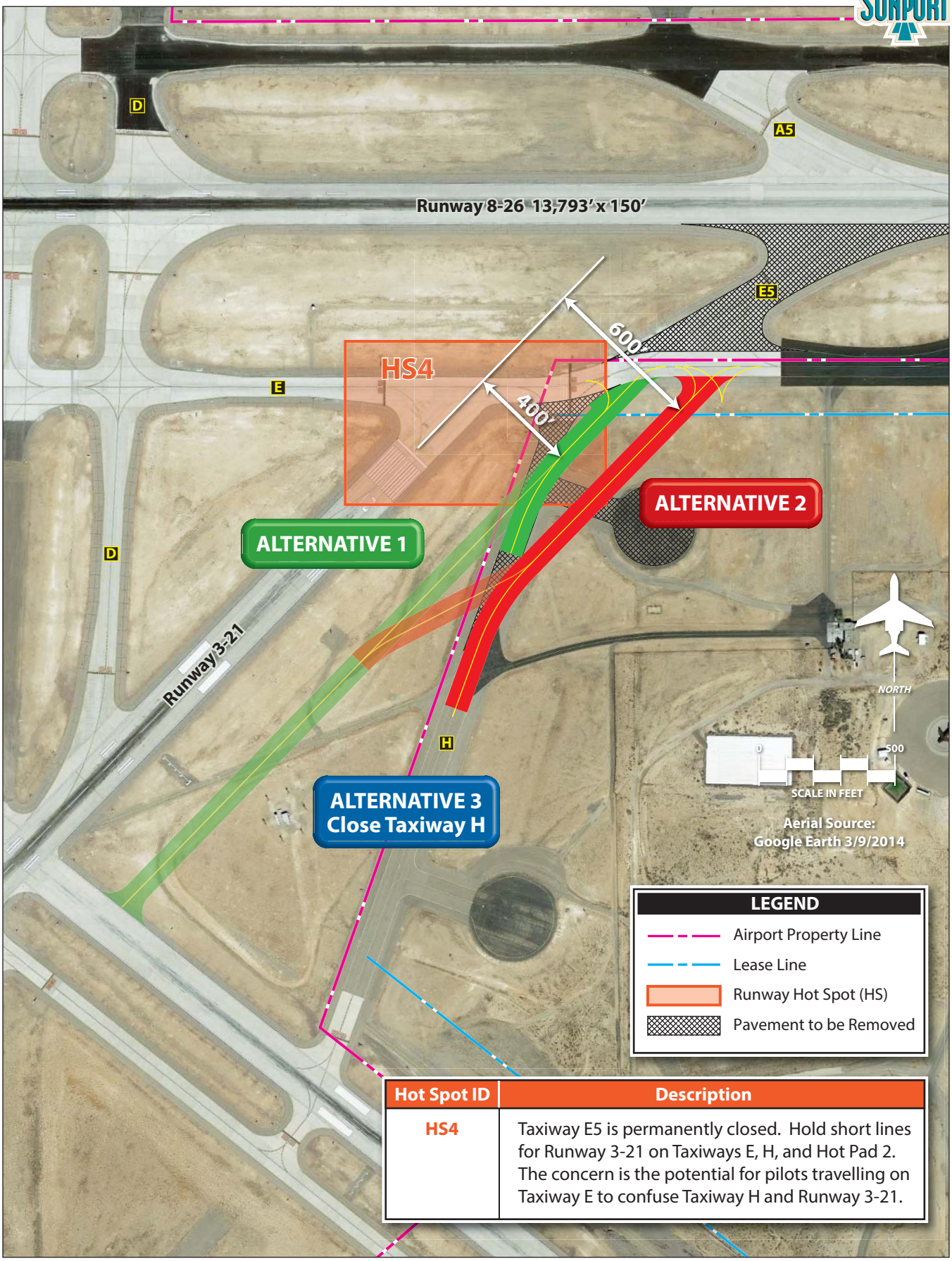
In conjunction with this alternative is the potential closure/removal of a portion of Taxiways C and J. This is considered because most general aviation pilots landing on Runway 30 will proceed to the south general aviation apron rather than the commercial terminal apron to the north.

Hot Spot 4 Alternatives

This hot spot is identified by the FAA because of the potential for pilots to confuse Runway 3-21 and Taxiway H. In addition, there are hold lines on Taxiways E, H, and Hot Pad #2. These hold lines are at unusual angles to the runway, which can be confusing. **Exhibit 5J** presents three potential alternatives.

Hot Spot 4 Alternative 1

This alternative considers slightly relocating the northern portion of Taxiway H so that it is parallel and separated by the standard 400 feet from Runway 3-21. The new portion of the taxiway would then reconnect with the existing taxiway. The exhibit also shows the potential continued extension of the new taxiway to be parallel with the runway. While this alternative relocated a portion of Taxiway H to the standard separation distance, it would connect with Taxiway E in an unusual manner. The connection would meet Taxiway E at a location where there is a slight “jog” in the taxiway, and it would be at an angle. This layout does meet design standard, but it could still be somewhat confusing to pilots.



Hot Spot ID	Description
HS4	Taxiway E5 is permanently closed. Hold short lines for Runway 3-21 on Taxiways E, H, and Hot Pad 2. The concern is the potential for pilots travelling on Taxiway E to confuse Taxiway H and Runway 3-21.

Exhibit 5J
HOT SPOT 4 ALTERNATIVES

Hot Spot 4 Alternative 2

The next alternative is like Alternative 1 in that the northern portion of Taxiway H is shifted to the east and constructed parallel to the runway. The difference is that it is shifted to a separation distance of 600 feet so that the intersection with Taxiway E is not located at the "jog" in Taxiway E, thus reducing the potential for pilot confusion.

This alternative would place the new portion of Taxiway H closer to Military Hot Pad #2. KAFB has indicated that they no longer need to use Hot Pad #2; therefore, it is planned to be closed in this alternative.

As with Alternative 1, the new portion of Taxiway H could be angled back toward Runway 3-21 at a standard separation distance of 400 feet in the future.

Hot Spot 4 Alternative 3

A third alternative is the possibility of closing Taxiway H. This would mitigate the hot spot, but it would also eliminate access to Military Hot Pad #3 which is at the south end of Taxiway H. A sub-alternative may be to only close the north portion of Taxiway H and leave the south portion in order to maintain access to Military Hot Pad #3; however, there would be longer taxi times.

RUNWAY 8 APPROACH SURFACE

All runways have a defined approach surface (not to be confused with the Part 77 Approach Surface) which is designed to protect the use of the runway in both visual and instrument conditions. The approach surface is also referred to as the threshold siting surface (TSS). The approach surface typically has a trapezoidal shape that extends away from the runway along the centerline and at a specific slope, expressed in horizontal feet by vertical feet. The specific size, slope and starting point of the approach surface depends upon the visibility minimums and the type of procedure associated with the runway end.

When approach surfaces are entirely clear of obstacles, instrument approach procedures will provide the optimum visibility and cloud ceiling minimums. When obstacles penetrate the approach surface, mitigation measures may include:

- Higher visibility minimums;
- Higher than normal glide path angles;
- Non-standard threshold crossing heights; and
- Final approach offset.

The approach surface for Runway 8 begins 200 feet from the displaced landing threshold. The inner width is 800 feet, the outer width is 3,800 feet, and it is 10,000 feet long. The surface slopes up and away from the inner width at a 34:1 angle. In addition, runways with a precision instrument approach,

such as Runways 8 and 3, have a defined final approach "X" surface which must also meet the same obstacle clearing standards. The "X" surface begins at the sides of the approach surface, extending 200 feet at a slope of 7:1.

Because the Runway 8 landing threshold is displaced by 1,000 feet, the approach surface and associated "X" surface cross over aircraft movement areas, most notably portions of Taxiway A, A1, A2, and E1. If the critical design aircraft (A300-600) is holding on these taxiways at the current hold lines, it penetrates the approach surface.

During development of this master plan, the issue of approach surface penetration by holding aircraft was analyzed separately. **Appendix E** presents this alternatives analysis.

DIRECT ACCESS AT TAXIWAYS A2 AND A3

Per FAA guidance, "Do not design taxiways to lead directly from an apron to a runway. Such configurations can lead to confusion when a pilot typically expects to encounter a parallel taxiway." Currently, both Taxiways A2 and A3 do not conform to this standard. Four alternatives are considered to mitigate this existing condition and are shown on **Exhibit 5K**. Several of the imaginary surfaces surrounding the runway are also shown as they have an impact on what alternatives are feasible.

Direct Access Alternative 1

The first alternative considers closing Taxiway A2 to eliminate direct access from the terminal apron to the runway. The hold line currently on Taxiway A1 is moved back to a location on Taxiway A that would keep aircraft out of the TSS. A second hold line would have to be located on the terminal apron taxilane to prevent aircraft from entering Taxiway A until cleared. A "no-taxi" island on the terminal apron is planned to prevent direct access to the runway via Taxiway A3.

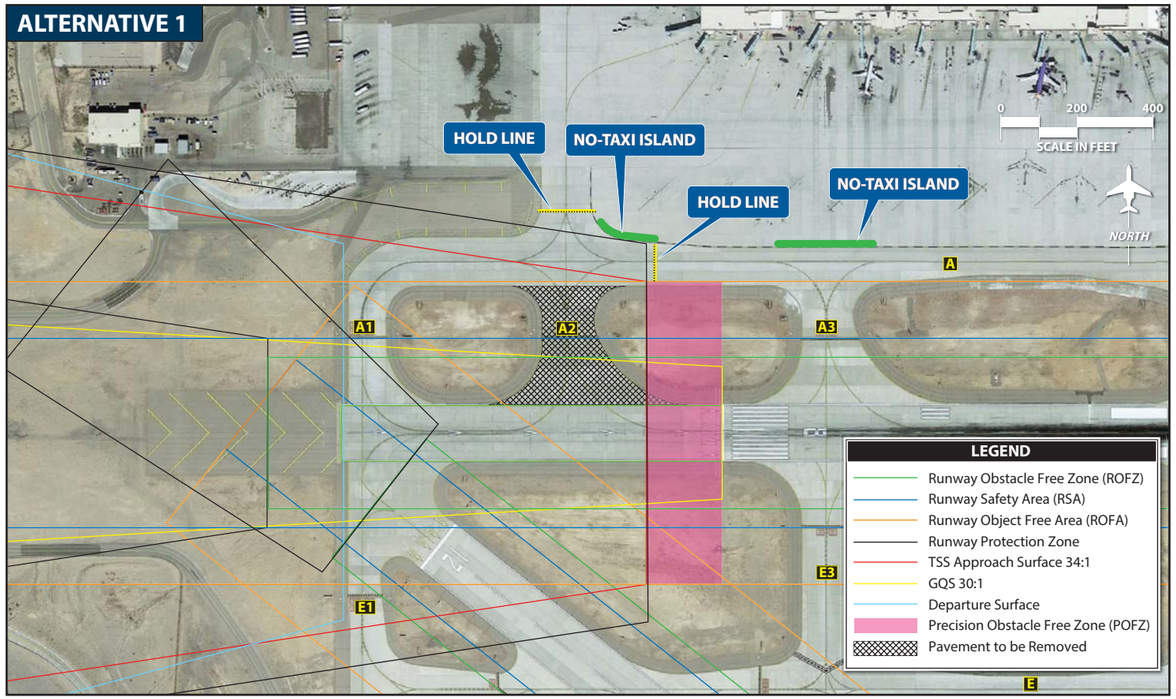
Direct Access Alternative 2

This alternative considers shifting the location of the terminal apron taxilane to the west, which would eliminate the direct access to the runway via Taxiway A2. This alternative would preserve the utility of Taxiway A2, which is frequently used by tower controllers for sequencing, departures, and bypassing during busy times. Shifting the taxilane to the west also facilitates the planned extension of Concourse B to the west. A "no-taxi" apron island is planned to prevent direct access to the runway via Taxiway A3.

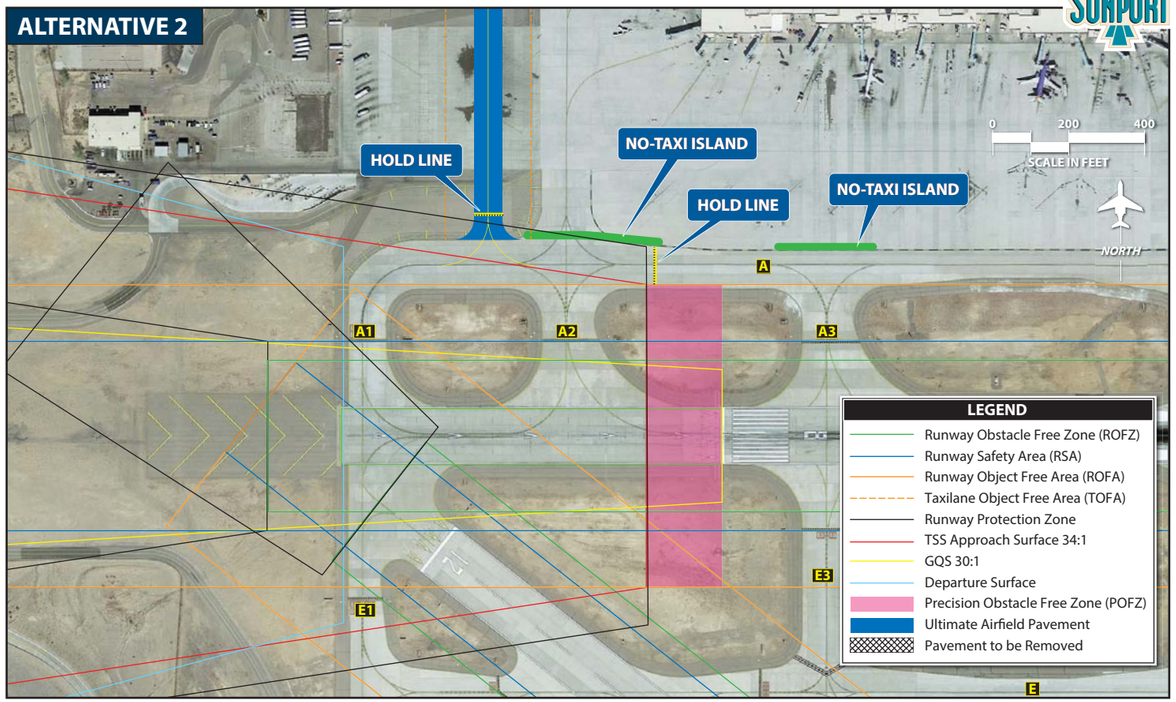
Direct Access Alternative 3

This alternative considers shifting the terminal apron taxilane to the east to eliminate direct access to the runway via Taxiway A2. A concern with this alternative is that several of the Remain-Over-Night (RON) aircraft parking positions would have to be removed. In addition, this alternative would necessitate several very tight turning movements by aircraft. A "no-taxi" apron island is planned to prevent direct access to the runway via Taxiway A3.

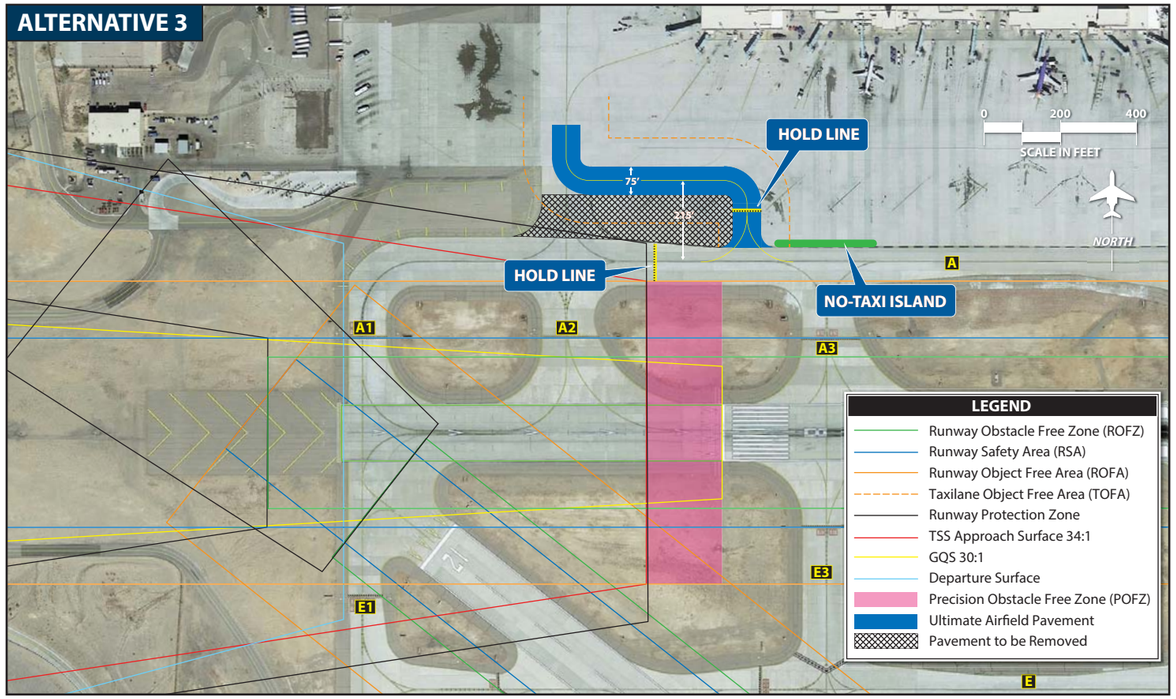
ALTERNATIVE 1



ALTERNATIVE 2



ALTERNATIVE 3



ALTERNATIVE 3A

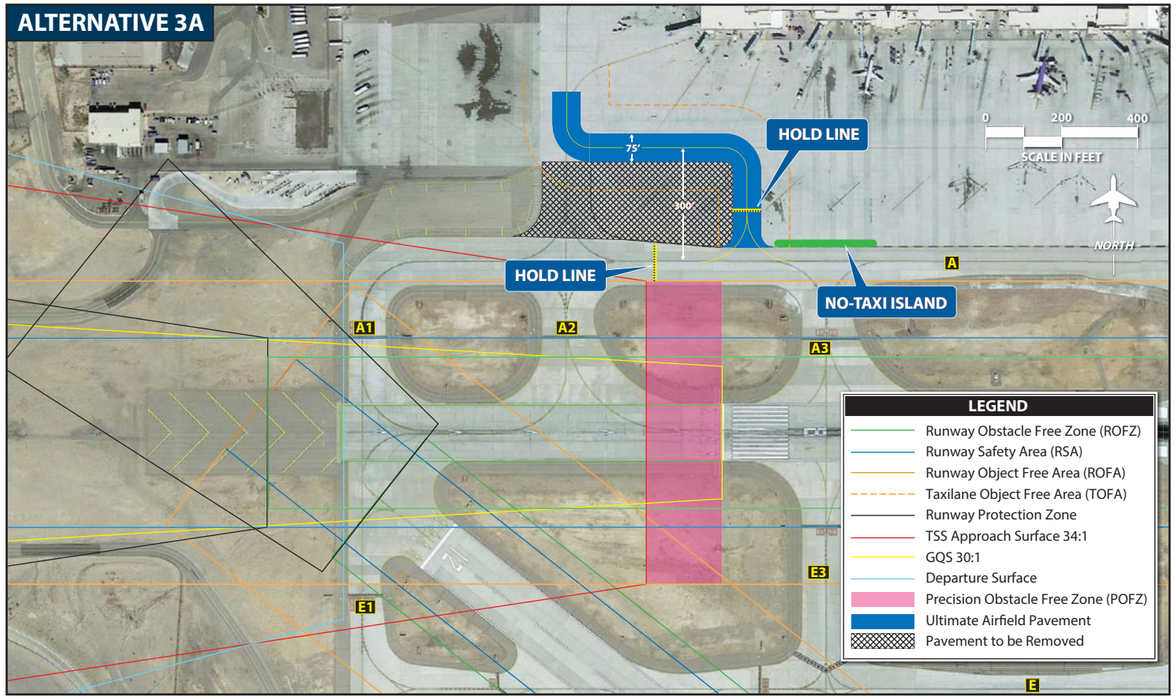


Exhibit 5K
TAXIWAY A ALTERNATIVES

This page intentionally left blank

Direct Access Alternative 3A

This variation of Alternative 3 shifts the location of the terminal taxilane toward the terminal building so that it coincides with the existing east/west terminal taxilane. This alternative would require removal of even more RON positions. A "no-taxi" apron island is planned to prevent direct access to the runway via Taxiway A3.

TAXIWAY EXIT ON RUNWAY 3-21

Interviews with operators at the Sunport and with FAA tower personnel indicate a need for an additional exit from Runway 21 to Taxiway F. The location considered is between exit Taxiways F3 and F6. Analysis of the potential usefulness of this new taxiway exit is presented on **Exhibit 5L**.

Interviews with operators at the Sunport and with FAA tower personnel indicate a need for an additional exit from Runway 21 to Taxiway F.

Currently, aircraft landing on Runway 3 must exit the Runway at Taxiway F3, which is approximately 6,200 feet from the landing threshold or they must roll out an additional 3,800 feet and exit at Taxiway F6. Under typical dry conditions, approximately 29 percent of large aircraft and 7 percent of heavy aircraft can exit at Taxiway F3. If an additional taxiway exit were available between Taxiways F3 and F6, then approximately 92 percent of large aircraft and 71 percent of heavy aircraft could exit the runway sooner. Exiting the runway quickly has many benefits, including increasing airfield capacity and reducing fuel burn emissions.

29% of Large Aircraft and 7% of Heavy Aircraft are able to exit using Taxiway F3
F2
F3
F4
F5
F6
F
Remove Pavement
6,200' to Runway 21 end
8,100' to Runway 21 end
92% of Large Aircraft and 71% of Heavy Aircraft would be able to exit using a new exit taxiway located 8,100' from Runway 21 end
NORTH
0
1,000
SCALE IN FEET
Aerial Source: Google Earth 3/9/2014

Large Aircraft: 12,500 lbs. to 300,000 lbs.
Heavy Aircraft: > 300,000 lbs.

Exhibit 5L
RUNWAY 3-21 NEW EXIT TAXIWAY EVALUATION

LANDSIDE DEVELOPMENT ALTERNATIVES

Landside development alternatives include consideration of the general aviation services, air cargo facilities, the passenger terminal complex, and other areas.

GENERAL AVIATION

The existing general aviation services are consolidated in the southwest portion of the airfield. Much of this area is developed with aircraft apron, hangars, and vehicle parking. The general aviation alternatives will focus on the following needs:

- Additional conventional hangars (with taller doors to accommodate larger business jets);
- Infill conventional hangars;
- Location for an apron to accommodate heavier aircraft; and
- Potential fuel farm expansion location.

Any future development of general aviation facilities, especially hangars, should only be undertaken when a need exists. For example, both fixed base operators (FBOs) have indicated a desire to build or lease new conventional hangars that have taller doors. This need is generated by the frequency of activity by operators of larger business jets. These operators typically prefer their aircraft to be parked in a hangar, especially if their visit includes an overnight stay.

In 1983, the City of Albuquerque opened Double Eagle II Airport, located approximately 10 miles to the northwest of the Sunport. This serves as a reliever to the Sunport and is designed to accommodate the range of general aviation operators. Today, the airport accommodates approximately 120 based airplanes, the majority of which are smaller single and multi-engine piston aircraft.

Over the years, Double Eagle II has established itself as the preferred base for owners of smaller general aviation aircraft, while general aviation facilities at the Sunport have evolved to primarily accommodate larger business jets. This trend is expected to continue, and new general aviation facilities are expected to serve this continuing development. As a result, alternatives for locating T-hangars or shade hangars for owners of smaller general aviation aircraft are not considered. Future general aviation facilities at the Sunport will focus on accommodating business aircraft.

Future general aviation facilities at the Sunport will focus on accommodating business aircraft.

Exhibit 5M presents several layouts for general aviation facilities. On the left panel, several new conventional hangars are considered. Those located immediately south of Taxiways E1 and K would require relocation of the existing fuel farm. Other large sites for conventional hangars include adjacent to the Atlantic Aviation FBO, on the back apron leased by Cutter Aviation, and finally slightly farther south adjacent to the existing T-hangars. A dedicated apron to support frequent use by large and heavy aircraft is considered in the triangle bounded by Taxiways E1, G, and K.

ALTERNATIVE 1

E
C
J
E1
G
Heavy Apron
757
737
Runway 12-30 6,000' x 150'
K
Access Road B
Fuel Farm
Hangars
Hangars
Fuel Farm
Access Road C
F
Hangar
F1
Runway 3-21 10,000' x 150'
NORTH
0
400
SCALE IN FEET
Aerial Source: Google Earth 3/9/2014

ALTERNATIVE 2

E
C
J
E1
G
Hangars
Heavy Apron
757
737
Runway 12-30 6,000' x 150'
K
Access Road B

ALTERNATIVE 3

E
C
J
E1
G
Access Road B
Hangars
Runway 12-30 6,000' x 150'
K

LEGEND

- Ultimate Building
- Ultimate Airfield Pavement
- Ultimate Road/Parking
- Pavement to be Removed

This page intentionally left blank

On the right side of the exhibit are two different layouts for the triangle area. The first is the possibility of closing Taxiway E1 to allow a public access road to enter the area. Several hangars are considered. The second considers a dual use for the triangle area, two hangars, and an adjacent heavy aircraft apron.

AIR CARGO

The Facility Requirement analysis indicated a future need for an additional 25,000 square feet of air cargo building space. In addition, approximately 13,000 square feet of delivery truck staging and parking is forecast to be needed. Input from Sunport staff indicates that aerial firefighting aircraft are staging from the air cargo apron with greater frequency. As a result, additional apron area is desired in proximity to the air cargo apron.

The location of air cargo facilities is well established in the southwest portion of the Sunport. **Exhibit 5N** presents two options for building expansion. It also shows the potential expansion of the air cargo aircraft apron. Beyond the planned air cargo apron expansion is additional space for delivery truck staging and parking.

The location of air cargo facilities is well established in the south-west portion of the Sunport.

PASSENGER TERMINAL COMPLEX CONSIDERATIONS

As outlined in the Facility Requirements chapter, the overall size of the terminal building is adequate through the long-term planning period; however, several functional elements are undersized currently or may become undersized in the near future (reference Exhibit 4K). Areas that may need expansion include retail concessions, food and beverage, federal inspection services (especially if international flights resume), TSA operations, and general circulation. In addition, consideration is given to the installation of a consolidated baggage screening process.

Consolidated Bag Screening

Currently, bag screening is done by TSA staff in rooms immediately behind the ticketing and bag check counters. This system has worked to satisfaction for years and can continue into the foreseeable future. The TSA has expressed interest in the potential for consolidating bag screening at ABQ.

While some modern airports have consolidated bag screening equipment, it is not universally accepted by airlines to be a more efficient process. As with any large mechanical system, problems can arise that may slow or stop the bag screening process. A centralized bag screening process necessarily mixes bags from different airlines that must then be resorted after screening. This extra layer of sorting increases chances for errors.

The layout of the Sunport has challenges to implementing a consolidated bag screening process. The ticketing and bag check counters are split to either side of the main central corridor and the Great Hall. To centralize bag screening, a conveyor system would have to transfer bags a great distance.

While there are challenges to a centralized bag screening process today, the concept has been considered in the past. In fact, with construction of the TSA screening checkpoint, soldier piles were installed in the pavement below to accommodate such a facility. Other ideas have included two separate consolidated bag screening systems on either side of the central terminal corridor (Great Hall). This concept would require use of existing aircraft apron area and may not be feasible. To address the TSA concerns, the concept of consolidated bag screening should be studied further beyond this master plan.

Concessions and Terminal Expansion

The previous ALP for the Sunport considered extending the concourse to the west to accommodate additional gates. This concept was also supported in the *West Area Support Plan* (May 2011). Current facility requirements continue to indicate a potential need for at least two additional gates. Previous analysis indicated that the most feasible method for adding gates was to extend concourse B to the west. Extending the concourse in this direction would necessarily shift the aircraft taxilane on the west side of the terminal apron to the west as well. This taxilane shift is feasible when the current air freight building is removed as planned.

Consideration has been given to the functionality of the proposed concourse expansion. As depicted on **Exhibit 5P**, the expansion can accommodate up to four additional gates, additional passenger holdroom space, additional concessions, and potentially new Federal Inspection Services facilities. As such, the concourse expansion is planned to include a gate to be utilized for international flight and passenger processing.

Additional retail concessions and food and beverage were shown to be needed in the short-term planning period. **Exhibit 5P** shows potential locations for these facilities.

Additional retail concessions and food and beverage were shown to be needed in the short-term planning period.

West Terminal Area Plan

The previously referenced *West Area Support Plan* (May 2011) presented a potential layout for a variety of support services. The primary feature of the plan was to accommodate an extension of concourse B by demolishing the belly freight building and shifting the aircraft taxilane slightly to the west. Support services such as the glycol storage, wash station, triturater, and waste collection were then arranged in a linear fashion facing the aircraft apron.

Since the completion of the *West Area Support Plan* (May 2011), some alterations have been made to the plan. A new Snow Removal Equipment (SRE) building is currently under construction, replacing an

OPTION 2

OPTION 1

Building Addition

Building Addition

F

F2

F3

F4

F5

F

Spirit Dr.

University Blvd.

Apron Expansion

Truck Parking and Staging

Runway 3-21 10,000'x150'

LEGEND

- Airport Property Line
- Relocated Fence
- Ultimate Building
- Truck Parking and Staging
- Ultimate Airfield Pavement

NORTH

0 300

SCALE IN FEET

Aerial Source:
Google Earth 3/9/2014

Exhibit 5N
AIR CARGO ALTERNATIVE

This page intentionally left blank

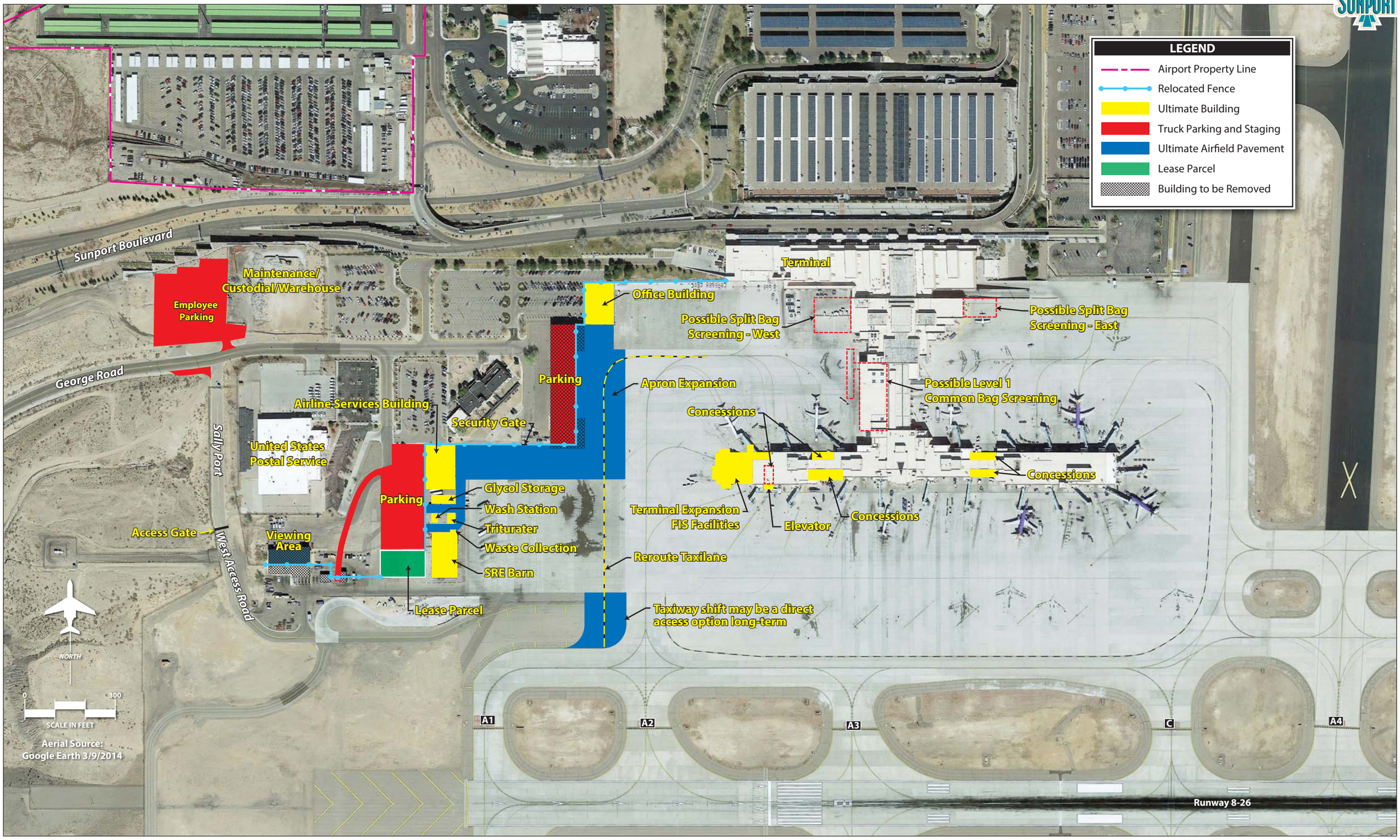


Exhibit 5P
TERMINAL AND WEST AREA CONSIDERATIONS

This page intentionally left blank

existing building. The planned location for other support services in the West Area has also been shifted, as depicted on **Exhibit 5P**.

A new feature of the West Area plan is to expand the parking and staging area closest to airfield entrance gate number #23. This is the primary entrance gate to the airfield for delivery vehicles. Most mornings, this gate area becomes congested as vehicles are cleared by security personnel. To alleviate this issue, the gate area is planned to be expanded. This will be feasible once the freight building is demolished.

The previous ALP considered extending an access road from University Boulevard to the east side of Runway 3-21. The road was to serve a relocated and consolidated maintenance and SRE facilities. As previously mentioned, a new SRE building is currently under construction in the West Area of the terminal complex. The existing maintenance facilities located just southwest of the general aviation area are planned to remain in their current location. As a result, future development of the east side of Runway 3-21 is not planned to include replacement maintenance/SRE facilities.

NON-AVIATION LAND USE CONCEPTS

In Chapter One – Inventory, several tracts of Airport property that are disconnected from the airfield system were identified for non-aviation land uses that can provide revenue to the Airport. Four specific areas are discussed in further detail below.

Aviation Center of Excellence (ACE)

The site plan approval process for the ACE project has been completed. The City Aviation Department can proceed with plans to lease the land to developers. A key component of the Site Plan for Subdivision is the provision for an expedited approval process for future Site Plans for Building Permit through the City's Design Review Team (DRT). The planned development includes commercial/retail along Gibson Boulevard, Office/Research and Development in the central portion, and aviation related on the south portion with taxiway access to the airfield. Limited access (right-in, right-out, left-in) is allowed to the ACE development area from Gibson Boulevard. Since this development plan is already established, no additional land use alternatives are considered.

Puerto del Sol Golf Course

This 72-acre site is located along the north side of Gibson Boulevard. It is currently leased to the City Parks and Recreation Department for use as a municipal golf course. Originally, the golf course was developed as a land use compatible with the clear zone for former Runway 17-35. Now that Runway 17-35 is closed, there is no longer a clear zone. Therefore, consideration may be given to a different long-term plan for the property. While alternatives can be considered, maintaining the property as a municipal golf course is also an acceptable alternative.

Exhibit 5Q presents a development concept for the golf course area that shows a variety of land uses, including commercial, single family attached and detached units, and park land.

The commercial area is located along Gibson Boulevard and is approximately 15.5-acres in size with an approximate depth of 550 feet. This area would be appropriate for a hotel and general commercial retail use. It could also accommodate office use. Access to the commercial area is shown from Girard Boulevard, Wellesley Drive, and Gibson Boulevard. Gibson Boulevard is a limited access arterial, so providing access in this location would require a traffic study and access study to be submitted to the City Department of Municipal Development (DMD) for review. If DMD agreed to sponsor the modification to the Gibson access policy, the request would go through the Mid Region Council of Governments Transportation Coordinating Committee, the same process that City Aviation had to follow with the ACE project on the south side of Gibson Boulevard.

The park area is approximately 16.5-acres in size. It spans the entire north-south axis of the property and is visible from three sides of the property. The existing water tower is in the center of the park area. A 50-foot buffer runs along the east side of Girard Boulevard from Gibson Boulevard to Vail Avenue where it then broadens out to a larger park area. A multi-use trail within the 50-foot buffer would provide a connection between the existing multi-use trail within the Gibson right-of-way and the park.

Two single family residential areas (approximately 20.5-acres in total) are located to the northwest and the southeast of the park area. Primary access to the single family residential areas is from Girard Boulevard. Two townhouse areas (approximately 18.5-acres in total) are located to the east of the park area along Wellesley Drive, which currently contains some townhouse development. Access to the townhouse areas is primarily from Wellesley Drive.

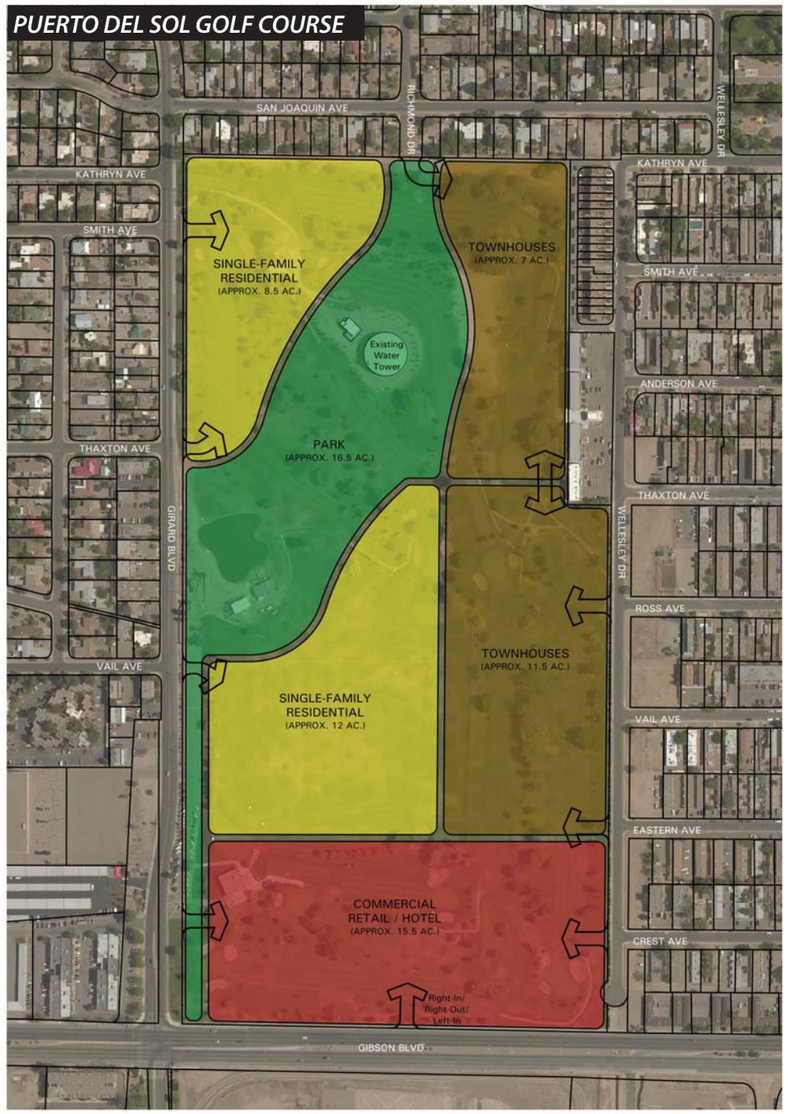
Sunport Business and Technology Center

This 65-acre site is located to the east of University Boulevard, west of Spirit Drive, and south of Clark Carr Road. It currently has a limited amount of development on the property, including existing airline operations on a 5-acre leased area and manufacturing on a 1.5-acre leased area. A Master Development Plan was approved by the Environmental Planning Commission for this property in 2008, which was also designated by the City Council as a Foreign Trade Zone. The Master Development Plan showed a north-south roadway through the property, but it was situated to the west of center. The lease areas were shown as a series of 17 small one- to three-acre lease areas. This limits development on this property particularly due to the topography and grade change from University Boulevard.

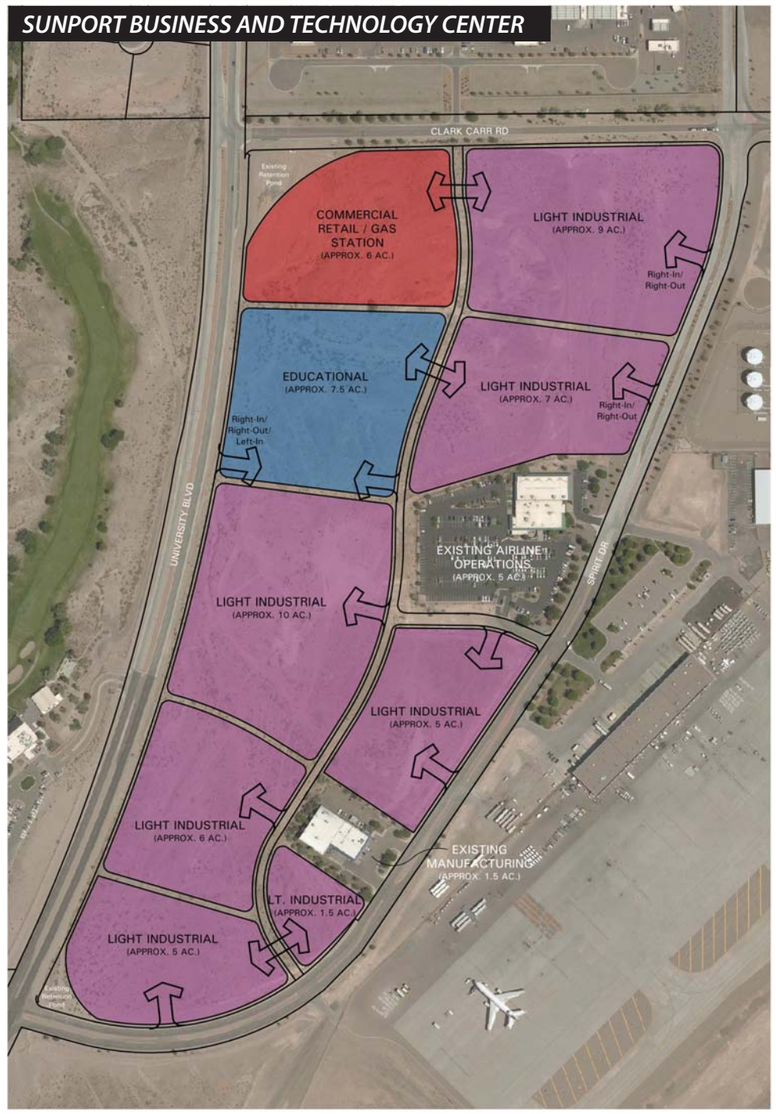
Exhibit 5Q shows a slightly different concept with the north-south internal road realigned to the east to provide more depth to the lease areas facing University Boulevard due to the topography challenges. As such, development of these lease areas would likely show a low floor area ratio. The internal road provides access to each of the eight proposed lease areas. Land uses include commercial retail, light industrial, and educational.

The commercial area, approximately 6-acres in size, is located at the northwest corner of the property along Clark Carr Road. It is across the street from the Sunport car rental facility. Due to this proximity, this portion of the property would be a good location for a gas station/convenience store.

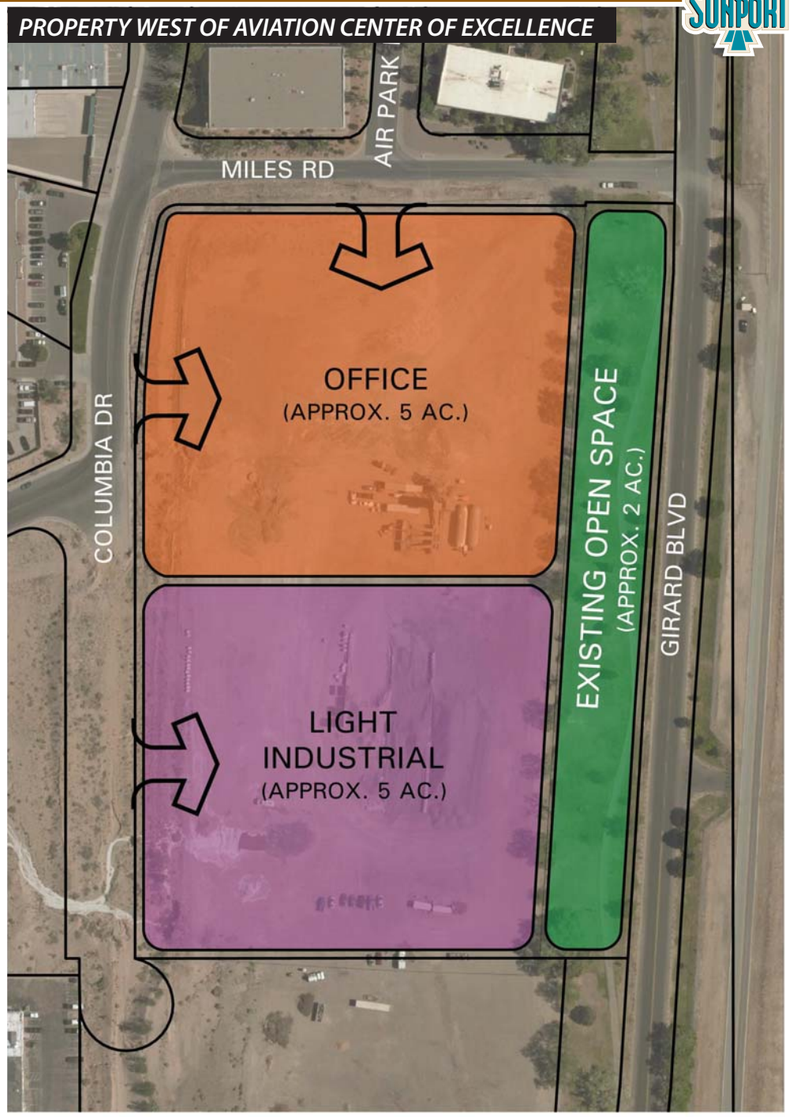
PUERTO DEL SOL GOLF COURSE



SUNPORT BUSINESS AND TECHNOLOGY CENTER


CLARK CARR RD
Existing Retention Pond
COMMERCIAL RETAIL / GAS STATION (APPROX. 6 AC.)
LIGHT INDUSTRIAL (APPROX. 9 AC.)
Right-In/ Right-Out
EDUCATIONAL (APPROX. 7.5 AC.)
Right-In/ Right-Out/ Left-In
LIGHT INDUSTRIAL (APPROX. 7 AC.)
Right-In/ Right-Out
UNIVERSITY BLVD
EXISTING AIRLINE OPERATIONS (APPROX. 5 AC.)
SPIRIT DR
LIGHT INDUSTRIAL (APPROX. 10 AC.)
LIGHT INDUSTRIAL (APPROX. 5 AC.)
LIGHT INDUSTRIAL (APPROX. 6 AC.)
EXISTING MANUFACTURING (APPROX. 1.5 AC.)
LT. INDUSTRIAL (APPROX. 1.5 AC.)
LIGHT INDUSTRIAL (APPROX. 5 AC.)

PROPERTY WEST OF AVIATION CENTER OF EXCELLENCE



This page intentionally left blank

To the south of the commercial area is the educational area, which is approximately 7.5-acres in size. Visibility and access from University Boulevard would be important for this use. As such, a limited access (right-in/right-out/left-in) from University Boulevard is shown. To provide this driveway access, retaining walls would be required on both sides of the proposed driveway.
The remainder of the site is shown with light industrial in variety of lease area sizes ranging from 5 to 10 acres. The exception is one lease area, 1.5-acres in size, located between the existing manufacturing use and the intersection of Spirit Drive and the proposed internal road.

Property West of ACE

This 12-acre site is located to the south of Miles Road and west of Girard Boulevard and the ACE project. It is envisioned as an extension of that project. A green space containing a multi-use trail runs north-south along the east edge of the property.

The concept presented on **Exhibit 5Q** shows one area each of office and light industrial uses, and the existing 2-acre green space. The office use is located on the northern 5-acres of the site, across from the existing Airport Business Park. Access to the office area is primarily from Miles Road via Girard Boulevard and is shown to align with Air Park Road. Secondary access to the office area would be from the existing Columbia Drive.

The light industrial area is located on the southern 5-acres of the site. A cross access easement with the office development would provide access to the light industrial area. Secondary access would be from an extension from the existing Columbia Drive to the south. The extension is currently platted, but it has not been constructed.

ALTERNATIVES SUMMARY

The process utilized in assessing airside, terminal, and landside development alternatives involved a detailed analysis of short and long-term requirements, as well as future growth potential. Current airport design standards were considered at each stage of development.

These initial alternatives present a proposed configuration of the Sunport to be developed over a long period of time. The next phase of the Master Plan will define a reasonable phasing program to implement a preferred master plan development concept over time.

Based on input from Airport staff, the Advisory Committee, and members of the public, a final Master Plan concept can be formed. The resultant plan will represent an airside facility that fulfills safety and design standards and a terminal area and landside complex that can be developed as demand dictates.

The preferred master plan development concept for the Sunport must represent a means by which the Sunport can grow in a balanced manner, both on the airside as well as the terminal area and landside, to accommodate forecast demand. In addition, it must provide for the flexibility to meet activity growth beyond the long-range planning period.

The remaining chapters will be dedicated to refining these basic alternatives into a final development concept with recommendations to ensure proper implementation and timing for a demand-based program.

SUSTAINABILITY GOALS AND OBJECTIVES

The Sustainability Baseline Assessment identified historical resource consumption rates and the applicable sustainability policies and procedures of the City of Albuquerque Aviation Department (Department). The information gathered in the Sustainability Baseline Assessment will serve as the foundation for the development of a series of goals, objectives and initiatives the Department can use to focus its sustainability efforts into the future. Furthermore, those sustainability goals will be utilized to evaluate the development alternatives considered in this Sustainable Airport Master Plan (SAMP) for potential sustainability benefits.

SUSTAINABILITY GOALS

The process of selecting appropriate goals begins by first restating the Aviation Department's overall sustainability goal for the Sunport, which is, "The City of Albuquerque Aviation Department will be increasingly sustainable with regard to natural resource conservation, economic strength and community contributions." Goals identified for each sustainability focus category are intended to be broad, achievable goals that do not identify specific performance targets or milestones. This allows flexibility for the Aviation Department to modify its program over time and keep within the framework of these goals.

The preliminary goals for each sustainability focus category, summarized in **Table 5B**, are intended as a starting point for further discussion and consideration by the Aviation Department and the Technical and Advisory Committees.

TABLE 5B
Preliminary Sustainability Goals
Albuquerque International Sunport

Sustainability Focus Categories	Preliminary Goal
Waste Management and Recycling	1. Expand the Sunport's existing waste management program to divert more waste from landfills through increased recycling, composting, and procurement policies.
Energy	2. Expand energy efficiency measures and renewable energy opportunities.
Air Quality and Greenhouse Gas Emissions	3. Commit to the betterment of regional air quality by supporting efforts to reduce greenhouse gas emissions from Sunport users and enacting policies to reduce emissions from Aviation Department-controlled sources.
Water Conservation and Water Quality	4. Reduce potable water consumption throughout the Sunport with expanded efficiency measures and reclaimed/grey water use.
Surface Transportation	5. Promote the utilization and expansion of alternative transportation modes to and from the Sunport.
Natural Resource Management	6. Incorporate procurement and construction policies to prioritize the use of more sustainable resources.

SUSTAINABILITY OBJECTIVES AND INITIATIVES

Tied to each sustainability goal are key objectives and initiatives. In contrast to the sustainability goals, sustainability objectives are more specific and can be measured using key performance indicators (KPIs). Initiatives are the individual projects that can be implemented by the Aviation Department to achieve specific objectives.

A preliminary list of sustainability objectives and initiatives has been identified for each goal from a variety of sources including the findings of the Sustainability Baseline Assessment, the Sunport's Sustainability Management System (SMS) Reference Document (see Section 1 of the Sustainability Supplemental Report), and a database of sustainable principles and practices maintained by the Sustainable Aviation Guidance Alliance (SAGA). SAGA is a volunteer coalition of aviation interests that formed in 2008 to assist airport operators in planning, implementing, and maintaining sustainability programs. Membership of SAGA is made up of many aviation/airport industry organizations, including the American Association of Airport Executives (AAAE), Airports Council International – North America (ACI-NA), Airport Consultants Council (ACC), the FAA, Airlines for American (A4A), and various airport consultants.

The sustainability objectives and initiatives identified for the Energy goal are sourced from the *Albuquerque International Airport Energy Audit Report* (Energy Audit Report) prepared by Quest Energy Group in November 2015. The full Energy Audit Report for the Sunport can be found in Section 3 of the Sustainability Supplemental Report of this Airport Master Plan.

A summary of the preliminary sustainability objectives and initiatives is provided in **Table 5C**. As a reminder, these preliminary objectives and initiatives will be further evaluated later in the SAMP process and are subject to change. Once the goals, objectives, and initiatives are finalized, detailed evaluation of each initiative will be performed along with the identification of KPIs.

TABLE 5C
Preliminary Sustainability Objectives and Initiatives
Albuquerque International Sunport

Objectives	Initiatives
Goal 1. Expand the Sunport's existing waste management program to divert more waste from landfills through increased recycling, composting, and procurement policies.	
1.1 Expand recycling marketing and promotion efforts within the terminal. 1.2 Engage tenants and airlines to ensure their involvement in the recycling program. 1.3 Collaborate with the City's Solid Waste Management Department on expanding the Sunport's recycling program. 1.4 Explore composting opportunities for food waste from on-site restaurants. 1.5 Conduct regular (annual/biennial) waste assessments to monitor solid waste and recycling rates.	▪ Expand educational and marketing materials (e.g., signs, public service announcements, etc.) within the terminal to encourage waste reduction and recycling. ▪ Coordinate with tenants to educate them on recycling opportunities available to them. ▪ As tenant and concessionaire contracts come up for renewal, incorporate incentives to ensure they are participating in recycling efforts. ▪ Provide food waste collection bins to separate food waste from normal waste. ▪ Donate surplus food to local shelters. ▪ Establish a paper conservation program within the Aviation Department. ▪ Conduct detailed waste composition assessments to identify the most common types and amount of waste collected.

Goal 2. Expand energy efficiency measures and renewable energy opportunities.	
2.1 Continue to transition to high-efficiency lighting. 2.2 Incorporate high-efficiency building equipment and HVAC systems. 2.3 Expand on-site solar photovoltaic (PV) systems.	▪ Replace indoor and outdoor lighting with LED fixtures. ▪ Upgrade lighting control measures in offices, conference rooms, baggage claim and Level 1 of the terminal building. ▪ Optimize daylighting controls in the gate areas. ▪ Optimize building HVAC equipment and control systems. ▪ Transition to high efficiency HVAC filters. ▪ Incorporate lighting and air conditioning efficiency measures into the terminal's Data Center. ▪ Install window film to south and west facing windows on the terminal building to lower solar heat gain and improve occupant comfort. ▪ Expand PV systems to other available parking lots. ▪ Consider PV systems in undeveloped areas of the Sunport. ▪ Convert the rental car facility's tracking solar thermal system to a tracking PV system.
Goal 3. Commit to the betterment of regional air quality by supporting efforts to reduce greenhouse gas emissions from Sunport users and enacting policies to reduce emissions from Aviation Department controlled sources.	
3.1 Promote the reduction or elimination of idling automobiles in and around the Sunport. 3.2 Promote purchase of replacement vehicle and ground support equipment powered with low-emission fuels. 3.3 Create an energy audit program for tenants to identify opportunities for energy use reductions.	▪ Post signage in common idle areas (e.g., cell phone lot, terminal curb) ▪ Ensure construction activities do not require vehicle idling. ▪ Issue notices or fines to vehicle operators who leave vehicles to idle for excessive periods. ▪ Purchase, operate and maintain alternatively fueled, electric, and hybrid vehicles. ▪ Promote the use of alternatively fueled ground support equipment (GSE), generators, and shuttle buses through future tenant lease agreements. ▪ Perform periodic energy audits and implement recommendations. ▪ Install carbon-offset kiosks where passengers can purchase offsets for their flight and discover the environmental impact of their flight. ▪ Install electric rechargers to allow airlines to buy electric GSE.

Goal 4. Reduce potable water consumption throughout the Sunport with expanded efficiency measures and reclaimed/grey water use.	
4.1 Expand fixture replacement to all outdated fixtures. 4.2 Improve facility metering to more accurately measure and manage water usage. 4.3 Implement both low impact development and green infrastructure techniques to improve stormwater runoff quality and to reduce water use for landscaped areas.	▪ Install motion sensors on all sink faucets. ▪ Install waterless or water-efficient urinals. ▪ Install sub-metering for concessionaires, cooling equipment, restrooms, and irrigation on mixed-use meters. ▪ Convert to reclaimed/grey water for irrigation use. ▪ Install bio-swales along parking areas to encourage groundwater infiltration of stormwater runoff. ▪ Convert cool season turf areas to more efficient warm season turf. ▪ Disconnect unused water meters. ▪ Install rainwater-harvesting systems for irrigation and non-potable uses. ▪ Utilize permeable pavement when applicable to promote absorption of stormwater.

Goal 5. Promote the utilization and expansion of alternative transportation modes to and from the Sunport.	
5.1 Expand on-site bicycle facilities for public use and coordinate with the City to connect the terminal to the citywide bicycle trails and paths. 5.2 Incentivize employee use of public transit and alternative fuel vehicles. 5.3 Utilize social media and other public outlets and media to promote the use of public transit or cycling to/from the Sunport. 5.4 Promote the Sunport as an expansion destination for the City's pilot bike share program (BICI).	▪ Promote bicycling to Sunport employees by providing end-of-trip facilities, including employee showers, lockers, and bicycle parking. ▪ Provide priority parking locations to carpools/vanpools and alternatively fueled vehicles. ▪ Promote the City's carpool matching service to employees and travelers on the Sunport website. ▪ Provide subsidized train and/or bus passes to employees and construction workers. ▪ Install on-site electric vehicle (EV) charging stations. ▪ Install low-emission refueling station.
Goal 6. Incorporate procurement and construction policies to prioritize the use of more sustainable resources.	
6.1 Coordinate with the City's Purchasing Division to establish a "Green" Procurement Program. 6.2 Utilize the FAA's Voluntary Airport Low Emission (VALE) program to transition to low-emission fleet vehicles when practicable. 6.3 Expand construction policies to include sustainable initiatives.	▪ Start a Green Procurement Program with emphasis placed on purchasing sustainable and/or locally sourced materials. The program should also require Energy Star certified equipment purchases when practicable. ▪ Develop and implement a Green Concessions Policy with guidance and standards for minimizing waste, enhancing recycling, generating demand for eco-friendly products, and providing healthier foods for passengers and employees. ▪ Require a U.S. Green Building Council LEED or equivalent building standard for major new construction or renovation activities. ▪ Expand records to monitor expenses dispersed to locally based vendors and supplies and for materials with recycled content.

ALTERNATIVE SUSTAINABILITY SCREENING CRITERIA

In addition to providing the framework for the Sunport's sustainability program, the sustainability goals may be utilized to screen the applicable airside and landside development project alternatives proposed in this SAMP. Ultimately, it is not the expectation that the most "sustainable" alternative will be selected for development on that merit alone. Other considerations must also be accounted for and include meeting FAA design standards, operational safety/security and efficiency, and economic/financing considerations. The sustainability screening tool is simply a supplemental evaluation method to give additional perspective on the options being weighted. The list of alternative sustainability screening criteria is presented in **Table 5D**.

Some of the sustainability screening criterions may or may not be applicable depending on the project considered. For example, projects involving the construction of additional airfield pavement or the installation of additional navigational aids will have no impact on enhancing alternative surface transportation modes to/from the Sunport. Each criterion is weighted based upon its relevance according to the results of the sustainability survey summarized in the Sustainability Baseline Assessment chapter. The results of that survey indicated that waste management and recycling, energy efficiency, and water conservation were the most important focus areas, while air quality, natural resource management, and surface transportation were less important focus areas. As such, alternatives that involve measures such

as generating on-site renewable energy receive a higher score than alternatives that improve public/alternative transit opportunities. Alternatives are evaluated by adding up the overall sustainability score.

As was previously stated, this sustainability score is intended as a supplemental evaluation method and will not be the only factor considered when selecting projects for inclusion in the recommended SAMP development concept.

TABLE 5D
Alternative Sustainability Screening Criteria
Albuquerque International Sunport

Alternatives Screening Criteria	Weight Value (3: Highest Importance – 1: Lowest Importance)
1. Waste Management and Recycling	
1.1 Can a significant amount (25% or greater) of waste generated as a result of the project be reused, recycled, or composted?	3
2. Energy	
2.1 Will this project result in a decrease in energy consumption?	3
2.2 Can on-site renewable energy generation be incorporated into this project?	3
3. Air Quality and Greenhouse Gas Emissions	
3.1 Will the project contribute towards a reduction in greenhouse gas emissions?	2
4. Water Conservation and Water Quality	
4.1 Will this project reduce potable water consumption?	2
4.2 Will this project reduce the amount of impermeable surfaces on the Sunport?	2
4.3 Can rainwater harvesting be incorporated into this project?	2
5. Surface Transportation	
5.1 Does the project provide opportunities for new public/alternative transit to/from the Sunport?	1
6. Natural Resource Management	
6.1 Can locally-sourced materials be utilized for this project?	1
6.2 Can renewable materials be utilized for this project?	1

Chapter Six

RECOMMENDED DEVELOPMENT CONCEPT

ABQ INTERNATIONAL SUNPORT

Sustainable Airport Master Plan

Chapter Six

RECOMMENDED DEVELOPMENT CONCEPT

The planning process for the Albuquerque International Sunport (ABQ) Sustainable Master Plan has included several analytical efforts in the previous chapters intended to provide forecasts of potential aviation demand for short-, intermediate-, and long-term timeframes; establish airside and landside facility needs and requirements that may be required to meet that demand; and evaluate options for improving the Sunport to meet the identified airside and landside facility needs. The analysis has also examined the existing geometry of the airfield in comparison to the most recent FAA design standards. Those areas identified as being either non-standard or areas of concern such as hot spots have been analyzed through the alternatives process.

The next step is to provide a single recommended development concept – a 20-year vision for the Sunport. The recommended development concept includes each of the elements that were considered in the alternatives chapter. This chapter will present, in graphic and narrative form, the reasoning behind consideration for each element included in the recommended development concept to ensure that the process used to select the recommended development concept is comprehensive, logical, and well documented.

In the Development Alternatives chapter, several elements of the Sunport Master Plan warranted a more in-depth analysis of viable options. A draft of the options was reviewed by the Sustainable Master Plan Committee (SMPC), presented at a Public Information Workshop, and made available on the project website. Comments and suggestions were received and reviewed by the project team. Where necessary, further analysis was undertaken. Ultimately, a recommended development concept has emerged

based on a thorough evaluation of the alternatives in the context of operational performance and best planning tenets. This section will briefly revisit the elements considered in the Airport Development Alternatives chapter and present the rationale for a recommendation for each element of the recommended development concept.

The recommended development concept is shown on **Exhibit 6A**. The major features include the following:

- Relocating the Runway 8 landing threshold to the west 600 feet;
- Identification of airfield pavement that may be removed from service without significantly impacting safety, efficiency, or capacity;
- Recommendations for mitigating the FAA identified hot spots;
- Taxiway geometry improvements that reduce the potential for runway incursions;
- Passenger Terminal concourse expansion;
- General aviation development;
- Air cargo development;
- Highest and best use of Sunport property, while maintaining its primary purpose of serving the air transportation needs of Albuquerque and New Mexico.

AIRSIDE ALTERNATIVES REVIEW AND RECOMMENDATIONS

The airside alternatives addressed issues related to approach surfaces on Runway 8, design standards on each runway, Hot Spots identified by the Runway Safety Action Team (RSAT), as well as taxiway considerations. Many of the potential solutions for various issues became interrelated. Perhaps most significantly were the issues related to the Runway 8 approach surfaces, its runway protection zone, and Hot Spot #1 at the convergence of Runways 8, 12, and Taxiway E. The following review begins with those issues then proceeds with the review and recommendations of other issues.

CONVERGENCE OF RUNWAYS 8 AND 12

As indicated above, there are three issues at the east end of the airfield where Runway 8-26 and Runway 12-30 essentially converge:

Runways 8 and 12 Hot Spot Issue: The departure thresholds at Runway 8 and Runway 12 can be directly reached from the same hold lines on Taxiways A1 and E1. This geometry can be confusing to pilots and could lead to departure on the wrong runway. This was identified as Hot Spot # 1 and was prioritized as a Runway Incursion Mitigation (RIM) location on the airfield. Analysis of Hot Spot # 1 (reference Exhibit 5F) presented additional alternatives that would decouple the runways.

During the alternatives review, the FAA decided to immediately initiate a Safety Risk Management review committee to study the alternatives for this Hot Spot. The SRM committee met on December 15

Inset B - General Aviation Area

Heavy Apron
Fuel Farm
Hangars
Hangars
Fuel Farm
Fuel Farm
Heavy Apron
Hangar
Access Road B
Access Road C
Scale: 1″ = 1,000′

Inset A - Terminal Area

Office Building
FIS/International Terminal
Possible Split Bag Screening - West
Possible Split Bag Screening - East
Parking
Apron Expansion
Airline Services Building
Security Gate
Concessions
Parking
ARFF
Glycol Storage
Wash Station
Tritarater
Waste Collection
Viewing Area
Terminal Expansion FIS Facilities
Elevator
Concessions
Concessions
Reroute Taxilane
Taxiway shift may be a direct access option long-term
SRE Barn
Island
Scale: 1″ = 600′

Inset C - Cargo Area

Building Addition
Building Addition
Spirit Dr.
Apron Expansion
Truck Parking and Staging
Scale: 1″ = 600′

Gibson Blvd.
Yale Blvd.
Girard Blvd.
George Rd.
University Blvd.
Access Road B
Access Road C
Spirit Dr.
Inset A
Inset B
Inset C
Runway 8-26 13,793′ x 150′
Runway 12-30 5,400′ x 150′
Runway 3-21 10,000′ x 150′ (Ult. 11,000′ x 150′)
1,000′ Runway Extension
25

LEGEND

- Airport Property Line
- Lease Line
- Ultimate Easement Line
- Relocated Fence
- Ultimate Building
- Truck Parking and Staging
- Ultimate Airfield Pavement
- Lease Parcel
- Pavement to be Removed from Service

NORTH

0 1,600
SCALE IN FEET

Aerial Source:
Google Earth 3/9/2014

This page intentionally left blank

and 16, 2015. A final SRM report (**Appendix F**) assessing the risk associated with the alternatives was published in March of 2016.

Runway 8 RPZ Issue: The approach and departure RPZs off the west end of Runway 8 have existing incompatibilities within them. Approximately 7.7 acres, mostly covering a portion of the rental car facility and public roads, is within the RPZs. These are considered existing incompatible land uses and it is the airport sponsor's responsibilities to seek opportunities, whether short-term or long-term, to clear the RPZ. FAA Memo*: Interim Guidance on Land Uses Within a Runway Protection Zone*, indicates that any new or modified incompatible land uses introduced to an RPZ are subject to additional analysis and approval by FAA headquarters.

Five alternatives were initially considered, including a no-action alternative and four different alternatives for relocating the landing threshold to Runway 8, thus relocating the approach RPZ. It was learned that each of the options for relocating the landing threshold would introduce more incompatibilities into the RPZ. All the existing incompatibilities are on the outer edges of the RPZ (Controlled Activity Area) and not within the Central Portion of the RPZ. A remaining concern with the no-action alternative is the encroachment on the refueler stands in the RPZ. While there is no fuel stored in this location, fuel is pumped via underground piping to the refueler stands and loaded in to the refuelers within the RPZ.

Runway 8 Approach Surface Issue: When certain large commercial and military aircraft, including the critical aircraft (A300-600), hold at the current hold lines on Taxiways A1, A2, and E1, they penetrate the approach surface to the displaced landing threshold for Runway 8. The approach surface, also referred to as the threshold siting surface (not to be confused with the FAR Part 77 approach surface), should be clear of obstructions, otherwise instrument approach procedures can be negatively impacted or removed altogether. This is a significant concern at this busy medium hub commercial service airport where instrument approaches to Runway 8 are critical to the operation of the airport. Although the current hold lines have been in place for decades, the FAA indicated that the current conditions are no longer acceptable and must be corrected.

At the request of the FAA, the latter issue was addressed further in a White Paper. **Appendix E – Runway 8 Approach Surface Penetration White Paper**, presents a detailed explanation of the approach surface issue as well as five alternatives. This White Paper was coordinated and reviewed with airport management, air traffic control personnel, FAA Airport District Office, and FAA Flight Standards. The resolution of the approach surface penetration issue impacts several other alternative considerations including the Runway 8 RPZ, Hot Spot #1, Runway 12-30, as well as direct access to the runway from apron areas.

The following five alternatives were considered:

- Alternative A – Relocate Hold Lines: Similar to Alternative 1 from **Exhibit 5K**, the primary feature of this alternative is to reposition the hold line at Taxiway A1 to a location on Taxiway A between Taxiway A2 and A3. Thus, holding aircraft would not be in the approach surface; however, they would be a much longer distance to the runway end.

- Alternative B - Create Hold Pad: This alternative considered construction of an aircraft hold pad to the north of Taxiways A and A1. This would reposition holding aircraft outside of the approach surface; however, it would create ground movement inefficiencies and does not position holding aircraft much closer to the runway end than Alternative 1.
- Alternative C – Remove Runway 8 Displaced Threshold: This is similar to Alternative 4 on **Exhibit 5C** as it considers the feasibility of relocating the landing threshold back to the pavement end. This is considered the cleanest alternative from an operations standpoint; however, the RPZ would be shifted to the west and extend over University Boulevard as well as an existing office building west of the roadway.
- Alternative D – Move Runway 8 Displaced Threshold 600 Feet West: This alternative was considered primarily to keep the office building outside the RPZ. Shifting the landing threshold back 600 feet (400 feet from the runway end) would accomplish this, although University Boulevard and the east parking lot of the office building would be inside the RPZ.
- Alternative E – Maintain RPZ West of University Boulevard: FAA specifically requested this alternative examined as it would keep the RPZ off University Boulevard. Unfortunately, this also serves to maintain the original problem with hold line repositioning still creating ground movement inefficiencies on Taxiway A and the west terminal apron taxiway. In addition, it maintains the other concern with the queuing area for the refueler stands remaining within the RPZ.

Recommendation: Following extensive consultation with FAA (tower and ADO) and others, it was determined that the best solution for the long-term is to plan for Alternative D – Move Runway 8 Displaced Threshold 600 feet west. **Exhibit 6B** presents this preferred concept.

As described in **Appendix E**, there are several design changes of note. The RPZ leading to Runway 8 is planned to extend to a location that is short of the office building. Much of University Boulevard could be relocated outside of the RPZ if determined necessary by FAA.

When shifting the Runway 8 landing threshold west 600 feet from its current location (400 feet from the pavement end), the ILS equipment will also need to be relocated. The approach lighting system will need to be shifted to the west, requiring taller structural supports. The glideslope antenna will need to be shifted to the west, placing the glideslope critical area over the current Runway 12 threshold. The glideslope critical area must be clear of anything that could potentially disrupt the signals, including aircraft on the ground.

To allow for the relocation of the glideslope antenna and associated critical area, Runway 12 is planned to be shortened by 600 feet on the northwest end. This length of 5,400 feet is just 100 feet shorter than the length of 5,500 feet noted by the facility requirements of **Chapter Four**. Up to 200 feet of runway length could be replaced on the southeast end of the runway without significant grading and relocations. All but approximately 100 feet of the length could be replaced on the southeast end if the Runway Design Code were changed from B-III to B-II.

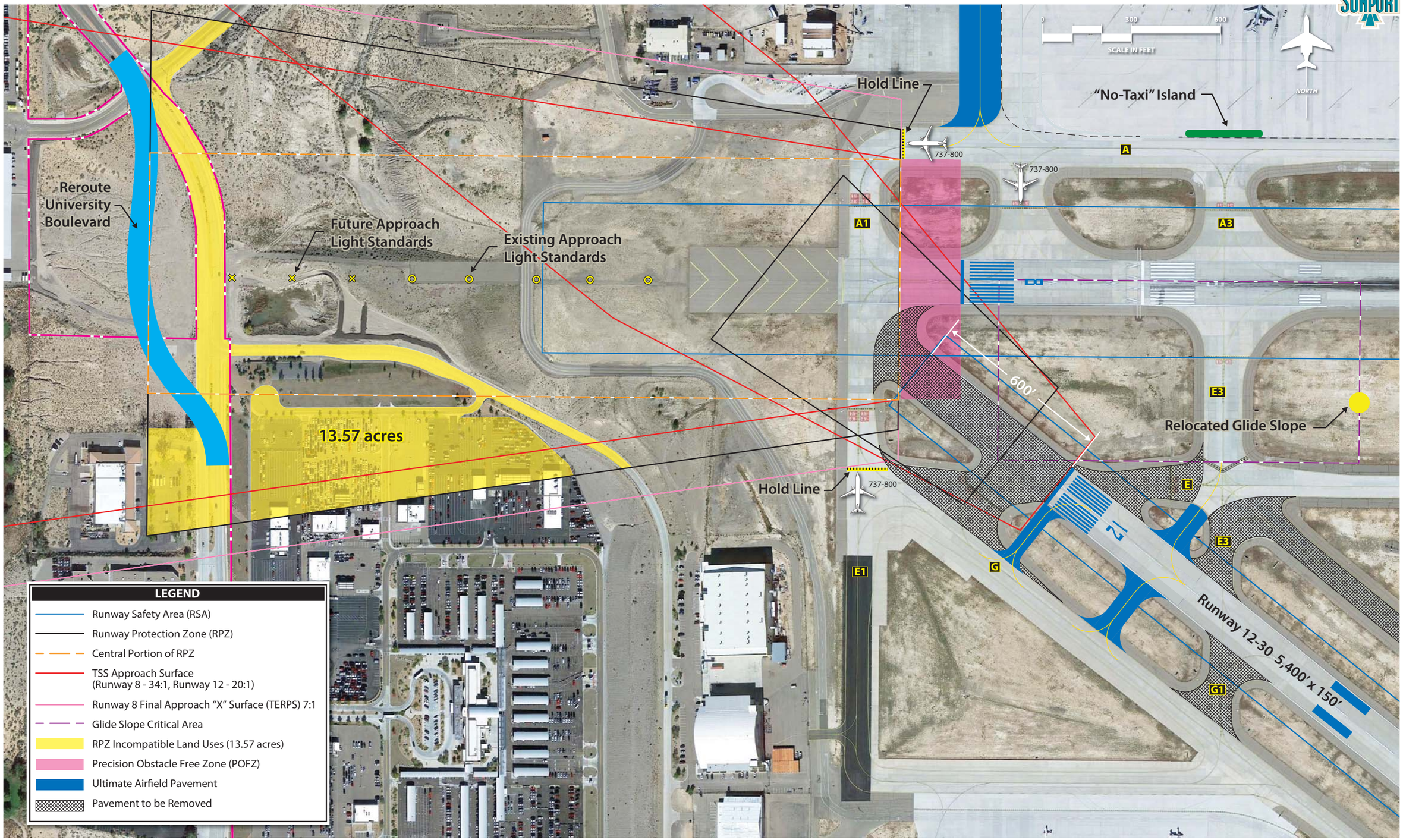


Exhibit 6B
RUNWAY 8 APPROACH SURFACE DETAIL

This page intentionally left blank

The taxiway system serving Runway 12 is redesigned so there is a crossing taxiway and a new threshold taxiway. By shortening or shifting Runway 12, the two runways would also be fully decoupled, thereby eliminating the Hot Spot #1.

RUNWAY 26 DESIGN STANDARDS

Issue: Several of the safety surfaces surrounding the east end of Runway 8-26 extend beyond Airport property. On the northeast side of the Runway 26 threshold, the RSA (1.6 acres), ROFA (4,7 acres), OFZ (0.06 acres) and the RPZ (17.6 acres) cross onto property owned by Kirtland Air Force Base (KAFB). According to FAA guidance, each of these must be under direct airport control, if not ownership, except for the RPZ, where ownership is recommended.

Alternatives Considered: Several alternatives were considered. The first was a no-action alternative. Historically, the Sunport and KAFB have understood the importance of protecting the design surfaces of the runways. Effectively, the two owners (KAFB and the Sunport) have controlled the runway safety areas in such a manner to protect their function and purpose.

Other alternatives considered were fee simple acquisition of the land by the Sunport, leasing the land in much the same manner as other dual use areas of the airfield, and shortening or shifting the runway. Neither shortening nor shifting the runway was considered feasible because of the need to maintain its current length and the extraordinary cost to shift the runway on the west end (a 100-foot elevation change).

Recommended Alternative: It is recommended that *Alternative 1 – No Action* be maintained. KAFB representatives on the Advisory Committees for this Master Plan provided written feedback on this issue. They indicated that KAFB is subject to the Air Installation Compatible Use Zone (AICUZ) Program as outlined in the Air Force Handbook 32-7084. They state, “Kirtland AFB makes every effort to comply with Air Force clear zone and accident potential zone (APZ) requirements in regard to planning or limiting development in these areas.” KAFB is also currently in the process of updating their master plan (Installation Development Plan) and are designating their property under the RPZs and clear zones as “airfield” to further limit development in these areas.

The portions of the RSA, OFA, OFZ, and RPZs that fall on KAFB property are adequately protected under this agreement. Consideration might be given to documenting the agreement through a Memorandum of Understanding (MOU) between KAFB and the Sunport.

RUNWAY 3-21 DESIGN STANDARDS

Issue: Similar to the property ownership issue related to the Runway 26 safety areas, small portions of the RSA (0.1 acre), ROFA (2.5 acres), and RPZ (0.3 acres) at the north end of Runway 3-21 extend onto KAFB property.

Alternatives: Each of the alternatives considered for Runway 26 could also apply to this location, such as acquisition, runway shortening, and runway shifting. The area of deficiency is clearly dedicated to and protected for aviation purposes; therefore, the potential for incompatible development or use is highly unlikely.

Recommended Alternative: The no-action alternative is recommended for this location. These areas will continue to serve their intended safety purpose. Consideration might be given to documenting the purpose of these areas through a Memorandum of Understanding (MOU) between KAFB and the Sunport.

RUNWAY 12-30 WIDTH

Issue: The runway is currently 150 feet wide, which exceeds the ARC B-III design standard of 100 feet for this runway.

Alternatives: Two alternatives were considered. The first was a no-action alternative which would maintain the current width of Runway 12-30. The second alternative considered narrowing the runway to a 100-foot width.

Recommended Alternative: The FAA typically will only consider minimum standards to be eligible for grant rehabilitation or reconstruction funding. The runway should be maintained at its current dimensions until such a time that a major rehabilitation or reconstruction is needed, and then a cost/benefit analysis should be undertaken to determine if it is cost-effective to maintain the current dimensions or be reduced to the standard at that time.

Prior to its next major rehabilitation, a cost/benefit analysis should be performed to determine whether Runway 12-30 should be narrowed to 100 feet.

RUNWAY LENGTH

Primary Runway 8-26 is 13,793 feet long currently. This pavement length is planned to remain the same as it is needed because of the capability of the critical aircraft, airport elevation, and the summer temperatures. When the landing threshold to Runway 8 is relocated west 600 feet, this additional length will be available for landing.

Crosswind Runway 3-21 is 10,000 feet long currently. While not justified currently, the airport layout plan will continue to protect for a potential 1,000-foot extension of this runway.

Crosswind Runway 12-30 is the general aviation runway and it is currently 6,000 feet long. Analysis previously presented indicates that a length of 5,500 feet is the design length for the primary users of this runway. Relocation of the Runway 8 landing threshold requires relocating the glideslope antenna

and associated critical area. To accommodate the glideslope critical area, the northwest end of Runway 12-30 must be shortened by 600 feet. Therefore, Runway 12-30 is planned to a length of 5,400 feet.

TAXIWAY EXITS FOR RUNWAY 8-26

Issue: In an effort to maximize efficient use of limited federal grant monies used for capital projects at airports across the country, the FAA is encouraging airports to examine the utility of all airfield pavements. Those pavements with low utilization, minimal safety enhancement, or with available alternate routes should be identified for potential closure or removal from funding eligibility.

Alternatives: For those taxiways serving Runway 8-26, an extensive analysis utilizing FAA guidance documents was undertaken. The results showed the utilization rates of the taxiways (see Exhibit 5D). Based on this information, several recommendations are made.

Recommended Alternative: The low utilization taxiways identified are Taxiways A4, E4, E9, and E11. Taxiway E7 is identified because, in conjunction with Taxiway E6, it does not conform to current taxiway geometry standards and there is an adequate alternative route via either Taxiway E6 or Taxiway E8. Taxiways A6 and A7 also do not meet current geometric design standards (they are high-speed exits that converge at the same location with the runway); however, these have very high utilization rates. Therefore, it is recommended that Taxiways A6 and A7 be removed and replaced with a single right-angle taxiway.

Considerations should be given to removing several underutilized taxiways from service.

TAXIWAY HOLD LINE LOCATION

Issue: The hold lines for Runway 8-26 and 3-21 are currently 250 feet from the centerline of the runways. The Runway 12-30 hold lines are 200 feet from the runway centerline. According to FAA AC 150/5300-13A, *Airport Design*, the location of hold lines is adjusted based on the elevation of the airport and the design aircraft. The adjusted standard hold lines on Runways 8-26 and 3-21 is 304 feet, and for Runway 12-30, 203 feet.

On November 23, 2004, the FAA approved a modification to standard (MOS) for all hold lines to remain in their existing location. The modification to standard letter from the FAA indicates that relocating the hold lines "could result in insufficient ramp separation and capacity issues." MOS are temporary measures and must be reviewed at least every five years or when additional planning projects are undertaken, such as this master plan.

Alternatives: **Appendix D** presents an analysis of the hold line MOS. Three alternatives were considered. The first considered rescinding the MOS and relocating all hold lines to the new location. The second considered adopting a new MOS which reaffirms the need to maintain the hold lines at their

current location. The third was to relocate all hold lines except those on Taxiways A1, A2, A3, and C, which would remain, and a new MOS would be issued for those locations.

Recommended Alternative: Alternative two is recommended because there has been no change in the reasoning for the original modification to standard.

HOT SPOT REMEDIATION

The FAA has identified four hot spots on the airfield where the potential for runway incursions is considered high. These hot spots were previously identified and discussed in **Chapter Four - Facility Requirements** (Exhibit 4JH) and in **Chapter Five – Alternatives** (Exhibits 5F, 5G, 5H, and 5J). There may be a wide range of potential solutions for hot spots. In some cases, geometric solutions (i.e., relocating or removing pavement) may be considered, while in others simply improving signage can help increase pilot situational awareness. In some cases, the best hot spot solution may be to take no action because viable alternatives might make the layout even more confusing.

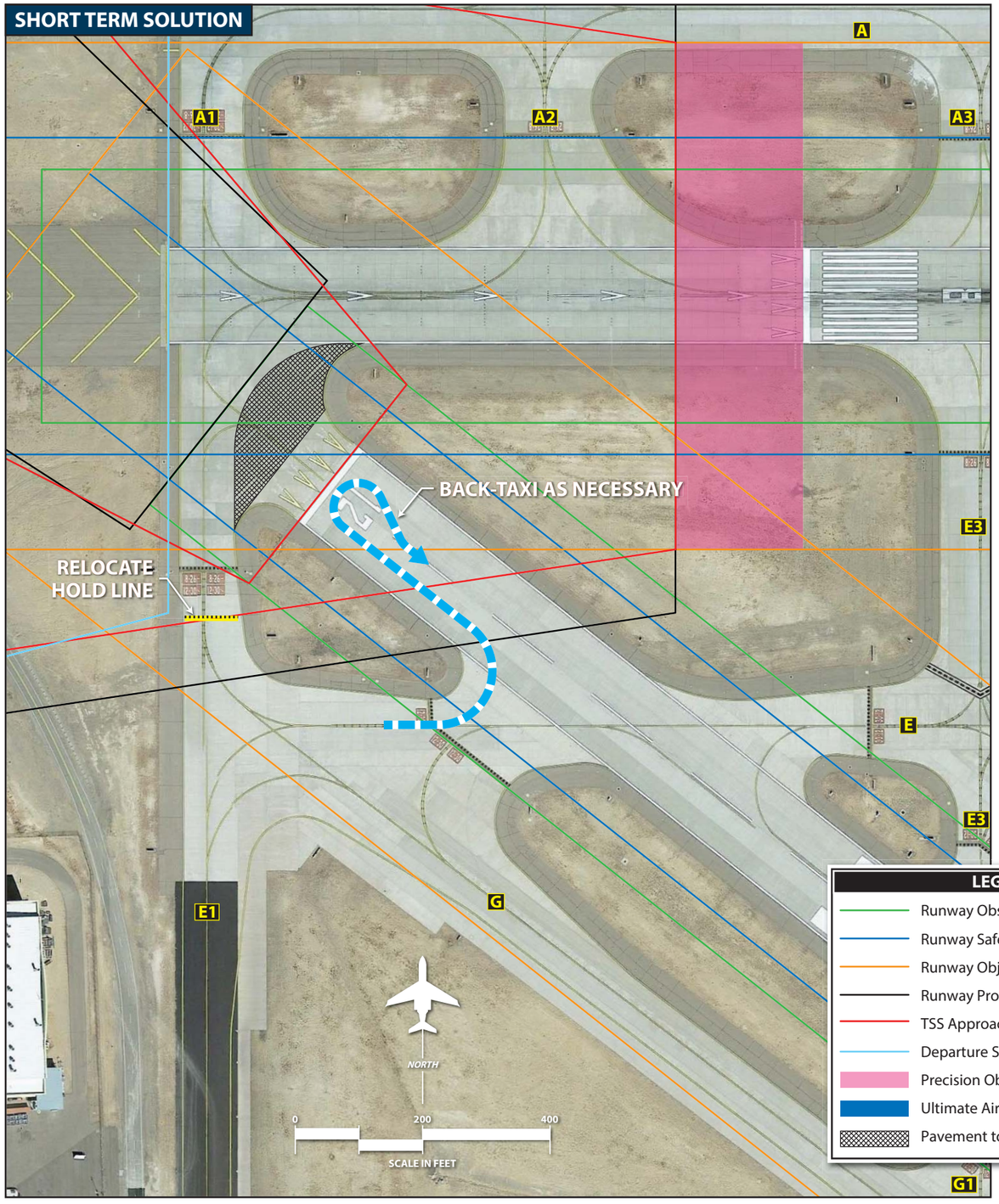
HOT SPOT #1

Issue: As noted earlier in the discussion regarding Runway 8 and Runway 12, this hot spot has the convergence of two runway ends. The hold lines on Taxiway A1 and E1 are the hold lines for both runways. As a result, it is possible a pilot could lose situational awareness and line up for departure on the wrong runway. The FAA included this hot spot on its initial list of high priority hot spots in the Runway Incursion Mitigation Program.

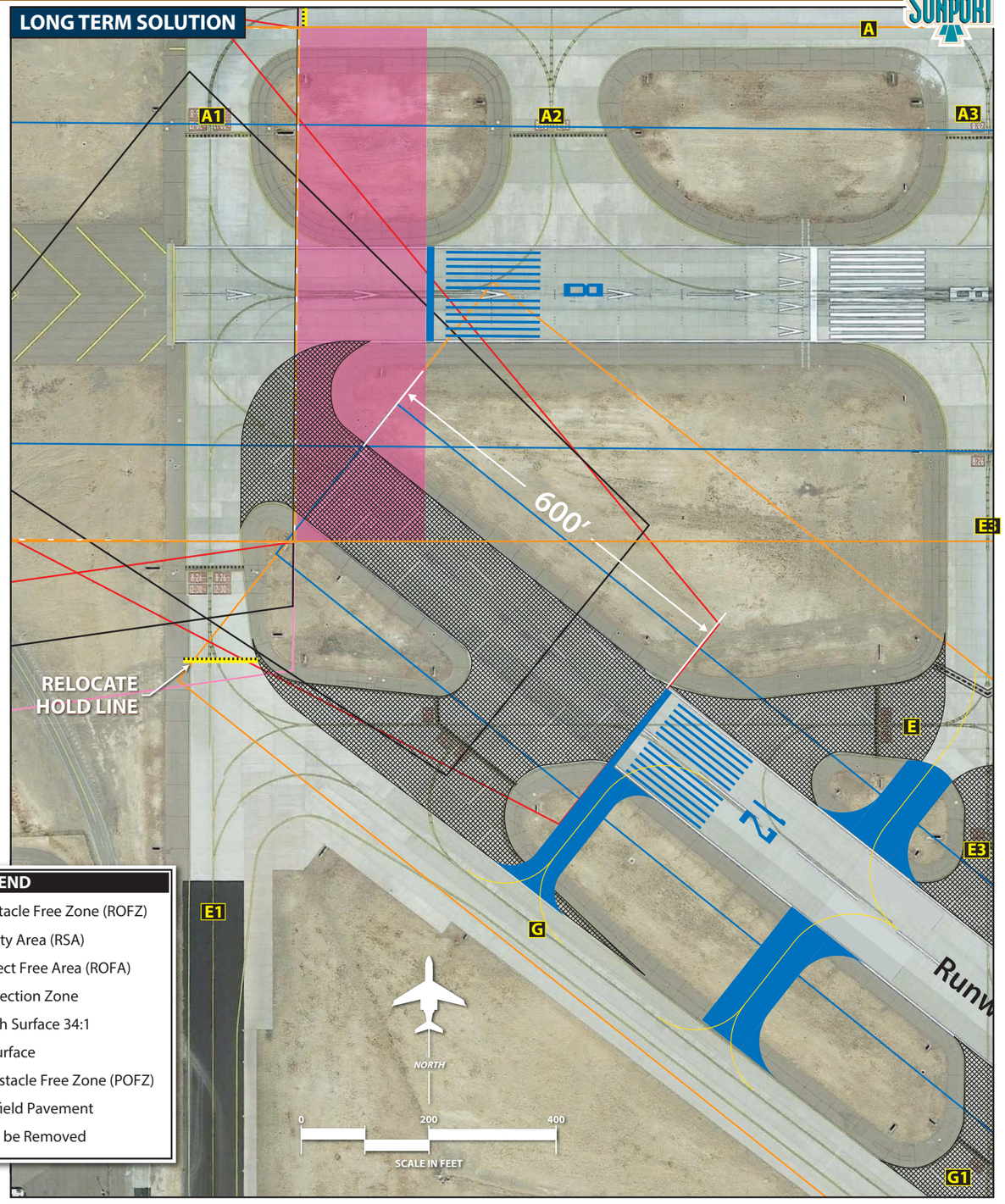
Alternatives: During the review of the draft alternatives in this Master Plan (see Chapter Five – Alternatives), it was determined by the FAA to immediately initiate a Safety Risk Management review committee to study the alternatives. The SRM committee met on December 15 and 16, 2015. A final SRM report (**Appendix F**) assessing the risk associated with the alternatives was published in March of 2016. As the airport sponsor, the City of Albuquerque, through its Aviation Department, makes the final determination of which alternative to pursue.

Recommendation: The short-term recommendation is to remove the lead-in taxiway element to Runway 12, as shown on the left pane of **Exhibit 6C**. This will remove the possibility of a pilot lining up on the wrong runway. Pilots will enter Runway 12 at Taxiway E. If pilots need additional runway length to take-off, they can back-taxi approximately 500 feet. The right pane of the exhibit shows the addition of a threshold access taxiway to Runway 12. This could be an intermediate step if operators and tower personnel find that the back-taxi procedure is too burdensome. To accomplish this, approximately 75 feet of the runway would be removed to allow the new threshold taxiway to access the end of the runway. In addition, this 75-foot distance is necessary to appropriately separate the hold line leading to Runway 8 and the new hold line for Runway 12, as well as the signage. The long- term solution is to shorten/shift Runway 12 by 600 feet, as previously shown on **Exhibit 6B**.

SHORT TERM SOLUTION



LONG TERM SOLUTION



LEGEND

- Runway Obstacle Free Zone (ROFZ)
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Protection Zone
- TSS Approach Surface 34:1
- Departure Surface
- Precision Obstacle Free Zone (POFZ)
- Ultimate Airfield Pavement
- Pavement to be Removed

Exhibit 6C
HOT SPOT #1 RECOMMENDATION

This page intentionally left blank

HOT SPOT #2

Issue: The second hot spot identified by the FAA is at the location of Taxiway G1. This taxiway provides a direct access connection from the general aviation apron to Runway 12-30. Current FAA geometry standards recommend eliminating direct access from an apron to a runway by forcing pilots to make a turn onto a parallel taxiway before making an additional turn onto a runway.

Alternatives: Three alternatives were considered to mitigate this hot spot. The first considered closing Taxiway G1. The second considered closing Taxiway G1 and constructing a replacement slightly to the northwest. The third considered creating an apron island which would force pilots to turn onto parallel Taxiway G1.

Recommendation: Following extensive review by the project team, the second alternative to relocate Taxiway G1 is recommended (see **Exhibit 6A**). Retaining a runway exit in proximity of Taxiway G1 was determined to be important because it is highly utilized by aircraft landing on Runway 30. The replacement Taxiway G1 is planned at a 90-degree angle to conform to FAA design standards. The third alternative of installing an apron island was not selected as many operators thought it would lead to greater confusion because of the oblique-angled layout of the apron and Taxiway G connection.

Taxiway G1 is recommended to be relocated to eliminate direct parking apron access to the runway.

HOT SPOT #3

Issue: The third hot spot on the airfield is at the convergence of Taxiways C, G, F, and Runway 12-30. This layout creates a wide expanse of pavement that could be confusing to pilots. While Sunport staff and ATCT personnel have indicated that there have been no issues with pilots in this area, airfield operations and maintenance vehicle drivers have been confused at times due the wide expanse of pavement.

Alternatives: Several alternatives to redesign the geometry of the location were considered. The first considered changing the Taxiway C exit from Runway 3 to a 90-degree angle to force pilots exiting Runway 3 to make a turn onto parallel Taxiway F prior to proceeding on Taxiway C to the terminal area. The second alternative considered simply narrowing the Taxiway C pavement width between Taxiway G and Runway 12-30. This would eliminate the wide expanse of pavement in the area and it would present a more common visual layout of the area for both pilots and airfield vehicle crews. The third alternative considered would have eliminated Taxiway C and created a new taxiway at the location of the closed runway. Although a much costlier change, it resolves the hot spot.

Recommendation: It is recommended that the second alternative of narrowing Taxiway C between Taxiway G and Runway 12-30 be implemented (see **Exhibit 6A**). This relatively minor solution would bring the geometry up to standard while preserving the functionality of the intersection. This is highly utilized pavement, especially for commercial aircraft landing on Runway 3 that will exit at Taxiway C and proceed directly to the terminal area.

HOT SPOT #4

Issue: The last identified hot spot is at the intersection of the Runway 21 threshold and Taxiway H. The concern here is that pilots could become confused between the two because of the proximity of Taxiway H to the Runway 21 threshold. The reason for the potential confusion is that Taxiway H is not a parallel taxiway; instead, it is angled so that its intersection with Taxiway E is closer than the standard 400 feet of separation. This geometry has made positioning of the hold lines challenging. An additional challenge is the fact that Taxiway H is on KAFB property.

Alternatives: Three primary alternatives were considered. The first considered shifting that northern portion of Taxiway H to a separation distance from Runway 3-21 of 400 feet. The second shifted the northern section of Taxiway H to a separation distance of 600 feet. The third alternative considered was to simply close Taxiway H.

Recommendation: The recommended long-term solution is to shift the northern portion of Taxiway H to a location 800 feet from the Runway 3-21 centerline (see **Exhibit 6A**). This was preferred over the 400-foot separation because that alternative would have placed the intersection with Taxiway E, at a "jog" in Taxiway E, which could make the intersection more confusing. The 600-foot option was not selected because Taxiway H would have entered Taxiway E at a location before the runway hold line of Taxiway E. By shifting the northern portion of Taxiway H to 800 feet separation from the runway, Taxiway H will enter Taxiway E outside the hold line. This alternative would require military Hot Pad #2 to be closed. KAFB has indicated that the closure is acceptable.

It should be noted that the hold lines in this area were relocated in late 2015 to mitigate the potential for incursions. Currently, there are Runway 3-21 hold lines on Taxiway E, Taxiway H, and at Hot Pad #2. Previously, Taxiway E5 was closed. All these efforts are intended to improve the situational awareness for pilots in the area.

DIRECT ACCESS AT TAXIWAYS A2 AND A3

Issue: FAA design standards indicate that taxiways should be designed in such a way as to prevent direct access from an aircraft apron to a runway, to reduce the potential for a runway incursion. Taxiways A2 and A3 currently allow direct access from the terminal apron to Runway 8-26.

Alternatives: Four different alternatives were presented to address the direct access issue. The first alternative considered closing Taxiway A2, thus forcing pilots to make a turn onto Taxiway A prior to again turning toward the runway on a connecting taxiway. A "no-taxi" island is planned at the edge of the terminal apron to prevent direct access to the runway via Taxiway A3. The second alternative considered shifting the west terminal apron taxilane slightly farther west so that it does not align with Taxiway A2. Thus, Taxiway A2 could remain operational. The third alternative considered introducing a "jog" into the west terminal apron taxilane so that the taxilane does not align with Taxiway A2. Alternative

3A was a variation on Alternative 3 in that it too shifted the west terminal apron taxilane to the east. This alternative attempted to take advantage on the existing terminal apron taxilane.

Recommendation: The short-term solution for Taxiway A2 is to remove it from service. The long-term solution is to shift the terminal taxilane that aligns with Taxiway A2 to the west. This will be necessary when the terminal Concourse B needs to be extended. Therefore, it is not recommended to remove the pavement for Taxiway A2, only mark it as unusable until the terminal taxilane can be shifted west, at which time Taxiway A2 can be reopened. For Taxiway A3, a "no-taxi" island on the edge of the terminal apron is planned to eliminate direct access to the runway via Taxiway A3.

OTHER AIRSIDE RECOMMENDATIONS

Taxiway J Closure: Taxiway J was originally constructed to provide a third (in addition to Taxiways C and D) south to north route for commercial aircraft landing on Runway 3 to access the terminal area. With Taxiway J, pilots were able to utilize Taxiway E3 to proceed toward the terminal area. While past operational forecasts indicated a need for this third route to the terminal area, actual operations were below those forecasts, and updated forecasts are significantly lower. As a result, Taxiway J has a low utilization rate and is recommended to be closed at such time major maintenance would be required to remain in service.

Direct Access from Cargo Apron to Runway: Taxiway F3 provides direct access from the cargo apron, across Taxiway F, to Runway 3-21. This is a direct access point that is non-standard under current design standards. With the availability of three other entrances to the air cargo apron, closing the short section of Taxiway F3 between Taxiway F and the air cargo apron is recommended.

Terminal Apron "Zipper Line": The Sunport has taken positive steps in the terminal area to alert pilots when they are approaching Taxiway A. A distinct line marking, commonly referred to a "zipper line" has been painted at the edge of the terminal area apron. Sunport management and FAA tower personnel have indicated that this marking has been extremely effective in preventing uncontrolled access to Taxiway A. In fact, there are no known instances when aircraft have crossed the 'zipper line' into the airfield operations area (Taxiway A) without tower clearance. By extension, no aircraft have further continued across Taxiway A into the runway environment without clearance. The 'zipper line' is planned to remain as an alert to pilots. A 'no-taxi island' is planned at the edge of the terminal apron adjacent to Taxiway A3.

FBO Taxilane (South): The taxilane connecting the south FBO apron to Taxiway F makes direct access available from the apron area to Runway 3-21 via Taxiway F1. To mitigate this situation, the connecting taxilane is planned to be relocated slightly to the southwest. At this location, it can be used to provide access to the planned heavy apron and to the FBO apron.

Non-Movement Area - General Aviation: Currently, Taxiways E1 and K located in the general aviation area to the southwest of Taxiway G are positively controlled by ATCT personnel. During review of the

development alternatives, consideration was given to removing this area from ATCT responsibility. Sunport staff and ATCT management as well as the FAA Airports District Office have concurred that this area should be removed from the airport operations area (AOA).

What this means from an operational perspective is that pilots in the general aviation area can utilize Taxiways E1 and K (south of Taxiway G) without prior authorization from the ATCT. Essentially, pilots will request and receive that authorization when they are ready to enter onto Taxiway G.

Taxiways E1 and K, south of Taxiway G, should be re-designated as non-movement areas.

Currently, the ATCT will allow pilots to perform pre-flight checks and run-ups on Taxiway E1 at the connection with Taxiway E. This location is planned to be removed from the AOA, re-designating it as a non-movement area; however, the need for a run-up area in this general location remains. To accommodate this need, an aircraft hold apron is planned at the north end of Taxiway G just south of the intersection with Taxiway E.

Additional Runway 3-21 Exit: Operators at the Sunport have long expressed a need for an additional taxiway exit on Runway 3-21 to serve aircraft landing on Runway 21. Currently, there is 3,800 feet between the last exit (Taxiway F6) and Taxiway F3. This has been especially important to cargo operators and others whose destination is the cargo apron. The recommended development concept includes this new taxiway exit strategically located midway between Taxiways F3 and F6.

Taxiway F3 provides direct access from the air cargo apron to the runway. Several options were considered to force pilots to make a conscious turn onto Taxiway F before making a turn onto the runway. Those options were an "apron island," relocating the apron entrance taxilane, closing the apron entrance taxilane at Taxiway F3, and closing Taxiway F3 between the runway and Taxiway F. Because there are four taxilane entrances to the air cargo apron, it recommended that the entrance taxilane at Taxiway F3 be closed.

Parallel Taxiway to Runway 3-21: The Airport Layout Plan (ALP) for the Sunport currently shows a partial parallel taxiway located on the west side of Runway 3-21. Due to constrained terrain, the taxiway was to extend from Taxiway F3 to the Runway 21 threshold rather than the full length of the runway. Such a taxiway could facilitate efficient aircraft movements, especially for those whose destination is the northeast portion of the airport. The partial parallel taxiway is planned to be retained for this Master Plan; however, it should be noted that this taxiway is not likely to be needed beyond the 20-year term of this Master Plan.

Runway 3-21 Extension: The ALP for the Sunport currently shows the future potential for a 1,000-foot extension of Runway 3-21 to the southwest. Analysis in this study has indicated that there is not a current need for this extension. Nonetheless, it is recommended that the extension remain in the plan and on the ALP to preserve this possibility well into the future. By preserving the planned extension, various land use control measures can continue to be enforced to protect the Sunport from potential encroachment.

PASSENGER TERMINAL AND WEST AREA PLAN

The analysis contained in this Master Plan indicates that the existing terminal building is capable of accommodating forecast growth through the long-term planning period. The current facility encompasses approximately 700,000 square feet and the forecasts indicate a long-term (20-year) need for approximately 677,000 square feet. A high-range growth pattern was also considered which would slightly exceed the current total capacity of the terminal building. With the current City Administration more actively supporting the Aviation Department in pursuit of new flights, this extends the viability of the plan to meet changes in growth.

The forecasts of aviation demand and the terminal building capacity analysis (see Exhibit 4K) indicate that the current overall terminal size is at about 83 percent of capacity. By the long-term planning horizon, the existing terminal building will be at approximately 96 percent of capacity.

While the total square footage of the facility appears adequate, several functional areas may become deficient in the more immediate term. Areas of concern include food and beverage and retail space. In the long-term and the high-range forecast, elements such as hold room space, aircraft gate spaces, circulation, and TSA/Federal Inspections space may be constrained.

Because of the current and forecast demand, it is recommended that the existing terminal building be retained and improved with modest modifications over time. This is a significant change from the previous Master Plan when higher passenger forecasts led to the recommendation of a second terminal building.

TERMINAL EXPANSION

As recommended, some functional elements of the terminal building should be improved to serve forecast demand. Concourse B is planned to be extended to the west and two new aircraft gates added. This space is also considered a potential location for Federal Inspection Services. Another option is at the current location on the west end of the main terminal. A separate feasibility study is being commissioned to examine these options in more detail.

Concourse B is planned to be extended and two new gates added when demand dictates.

Additional concessions space is also considered for both concourses. Any expansion of the building should maintain the architectural integrity of the building by following the pueblo block style of the existing facility. The current City Administration has initiated efforts for more robust use of the terminal to display art and provide a representation of the community to arriving passengers.

BAG SCREENING

Attention was given to the bag screening process. As noted in Chapter Five – Alternatives, TSA bag screening occurs behind the airline ticket counters currently. The alternatives considered the feasibility of a consolidated bag screening process. The advantages of a consolidated bag screening process include the perception of greater efficiency. While consolidated bag screening is preferred by TSA, it is not universally accepted by airlines. The analysis and discussion regarding bag screening indicated several reasons to maintain the current system:

- The current bag screening system is efficient;
- Bags associated with each airline are not comingled (as they would be with a consolidated system) thus reducing the possibility of misplaced bags.
- The physical layout of the terminal building would make a consolidated system very challenging.

A single consolidated bag screening process was originally planned in proximity to the TSA passenger screening area. To address the TSA concerns, it is recommended the consolidated bag screening concept be studied further beyond this master plan.

WEST SUPPORT AREA PLAN

Exhibit 6D shows both the terminal building plan as well as the plan for the area west of the terminal building. The exhibit shows the potential extension of Concourse B, which in turn necessitates shifting the location of the terminal area taxilane. As discussed previously, shifting the terminal taxilane provides an added benefit by eliminating the direct access issues with Taxiway A2.

The development of the west area in this fashion will require the existing belly freight building to be removed. This area would then be utilized for the taxilane and for additional employee parking.

The Sunport has begun construction of the new snow removal equipment (SRE) barn. This facility is planned to be operational in 2016. Other elements in the west area are also planned to provide support services to the operators at the Sunport.

LANDSIDE RECOMMENDATIONS

The landside plans include recommendations for the general aviation areas and air cargo facilities as well as other support facilities. The following subsections discuss each component of the landside recommendations.

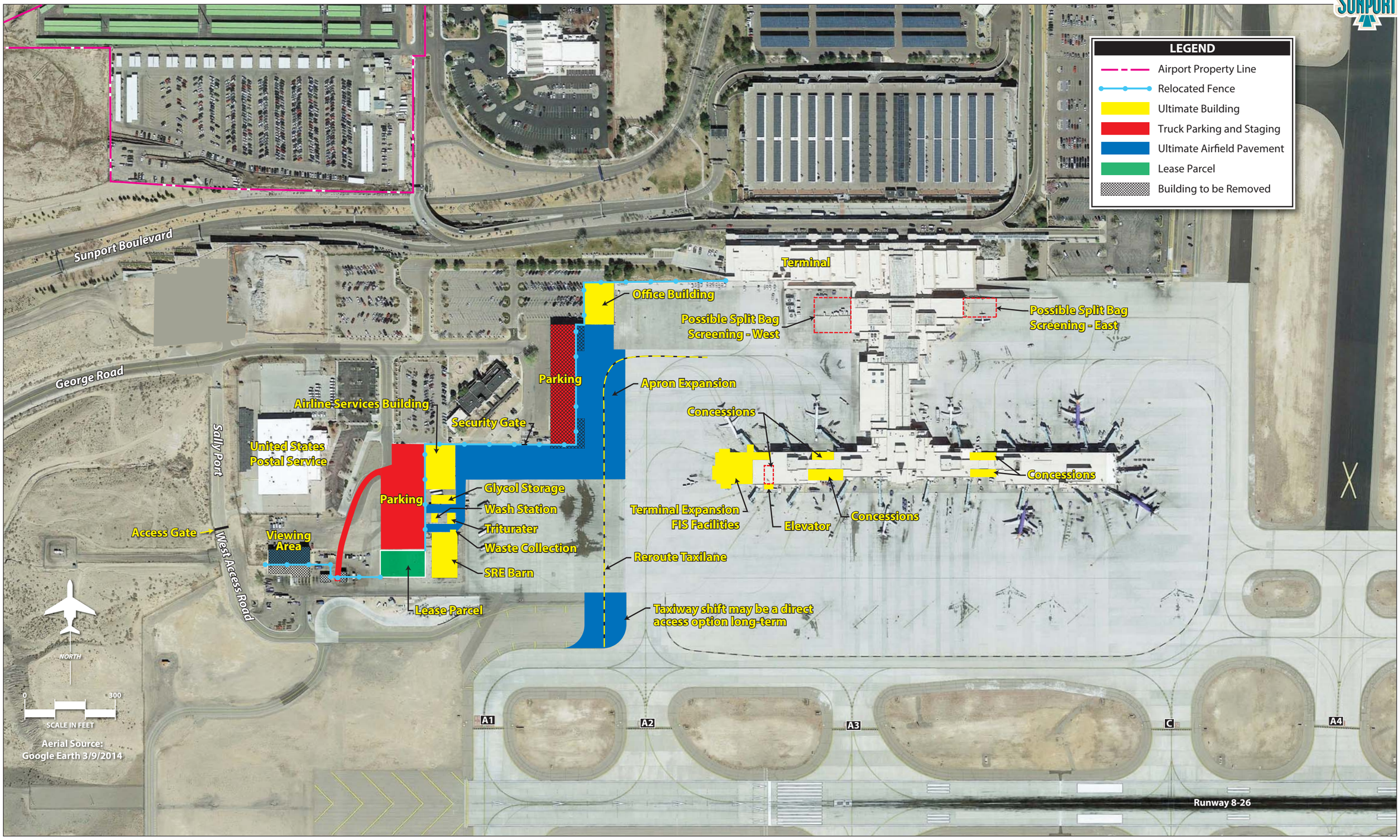


Exhibit 6D
TERMINAL AND WEST AREA PLAN

This page intentionally left blank

MAINTENANCE FACILITIES

The maintenance yard at the Sunport is planned to remain in its current location. The previous Master Plan considered the possibility of relocating maintenance functions to a consolidated facility to be located on the south side of Runway 3-21. The new plan is to maintain the existing location just south of the general aviation area into the future. Certain maintenance functions are planned to be relocated closer to the terminal building and runway system, such as the new SRE barn. The Sunport should continue to upgrade facilities and equipment on a regular schedule.

FUEL STORAGE CAPACITY

The fuel storage facilities are planned to remain in their current location. The larger storage tanks will remain in the southwest portion of the Sunport. A pipeline delivers Jet A to the refueling station located at the west end of the terminal apron. This set up allows fuel trucks to be refueled without traversing the airfield. The Sunport has a storage capacity of approximately 1.4 million gallons of Jet A fuel. This is adequate to maintain a 7-day supply through the long-term planning period.

The Sunport has available approximately 40,000-gallon storage capacity for AvGas. To maintain a 14-day supply, this level of capacity is adequate through the long-term planning period.

AIR CARGO FACILITIES

The air cargo facilities located at the southwest end of the Sunport are adequate through the short-term planning horizon. By the long-term planning period, there may be a need to expand the air cargo sort facility. To this end, space on both sides of the existing facility is reserved for expansion.

Additional air cargo apron may also be needed to support future additional aircraft. In fact, this may become a higher priority than the sort facility as a portion of the air cargo apron is leased for aerial fire-fighting tankers. To meet future needs, the area to the immediate south of the existing air cargo apron is reserved for apron development.

Space is reserved for expansion of the air cargo building and aircraft as needed.

The air cargo and air freight companies that operate at the Sunport have a need for additional truck staging area. The area planned for future air cargo apron may be utilized for this short-term need. Ultimately, an area adjacent to the planned air cargo apron could be improved for additional truck staging.

GENERAL AVIATION

Even with the availability of Double Eagle II airport, there will be a continued presence of general aviation activity at the Sunport. There are two nationally known fixed base operators (FBO) located at the Sunport that cater to private business jets, private commercial type jets, and some transient military. In

addition, there are two businesses that manufacture aircraft. The Sunport also owns two T-hangar structures rented to owners of smaller piston powered aircraft.

The main feature of the general aviation plan is to identify suitable locations for additional hangar development as well as apron pavement strengthening for parking of heavy aircraft. **Exhibit 6E** presents an overview of the planned general aviation layout.

The main feature of the general aviation plan is to identify suitable locations for hangars and apron that can accommodate heavy aircraft.

The FBOs have indicated an increase in activity by operators of larger jet aircraft, up to commercial-type aircraft such as Airbus A310 and Boeing 737. On occasion, even larger aircraft like the Boeing 747 need to be accommodated. There is also demand for these aircraft to be stored in a hangar. The challenge is that there are no hangars currently available with suitable door heights. The plan shows several potential hangar sites. The utilization of these hangars should be considered to primarily accommodate a taller aircraft tail height.

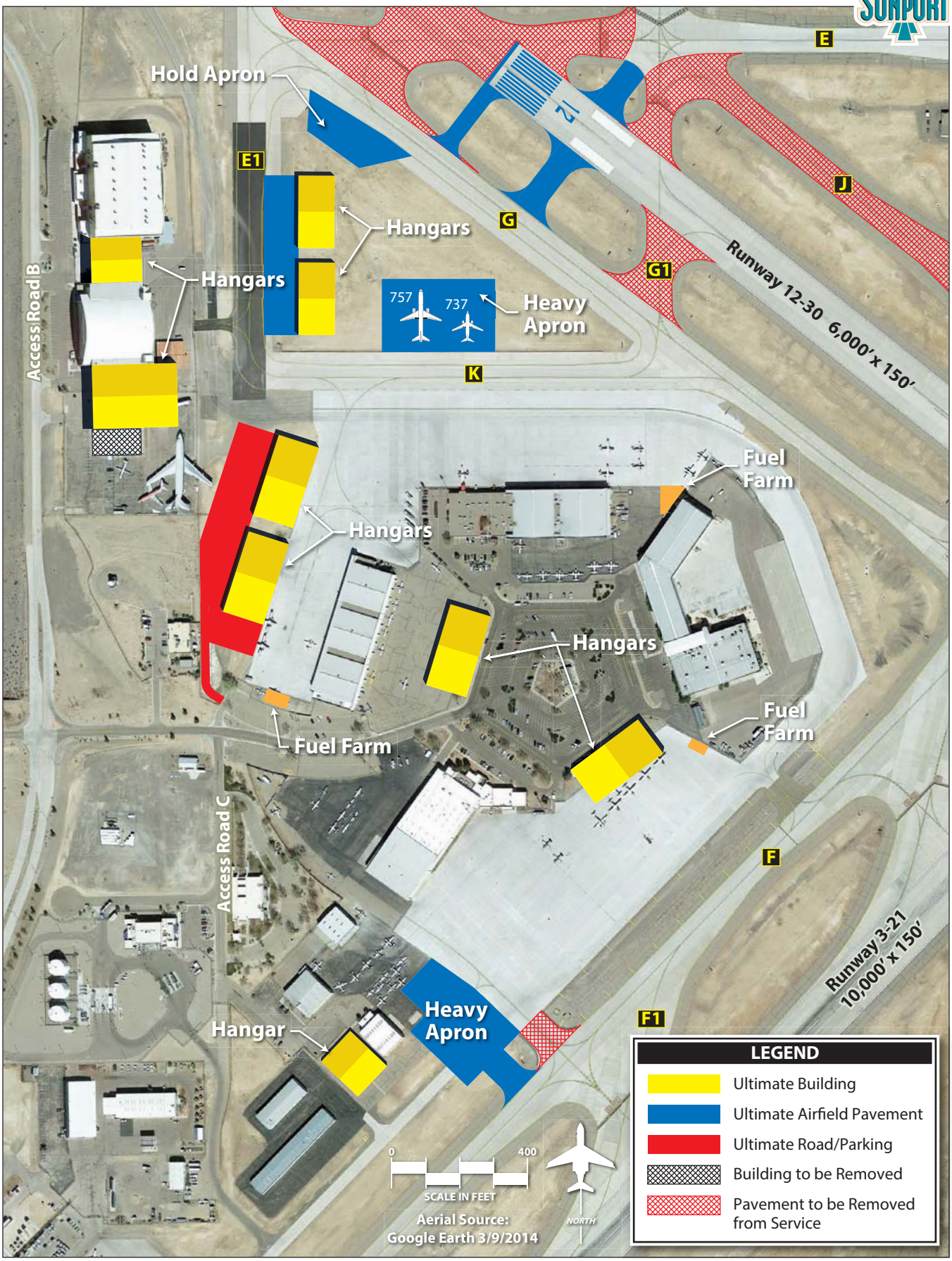
Currently, heavy aircraft are parked on Taxiway K, which is strength-rated for heavy aircraft. Both FBOs have indicated a need for dedicated apron area, in proximity to their operations, to accommodate heavy aircraft. To this end, two heavy apron areas have been identified. The first is located immediately north of Taxiway K and the second is to the south, adjacent to the other FBO apron.

Several hangar locations are shown on the exhibit. To the north, in the triangle area bounded by Taxiways G, E1, and K, two large hangars are planned. Public road access is not provided to preserve the highly utilized aircraft taxi route from Taxiway E1 to K. Instead, these hangars would be best suited for aircraft storage or manufacturing. The maximum height of these hangars is estimated at approximately 50 feet. At this height, the transitional surface that begins 250 feet from the Runway 12-30 centerline and extends upward at 7:1 would be clear.

To the west of the Cutter Aviation offices is a site considered for two new large hangars. This location is where the fuel farm is currently located, so this would have to be relocated to accommodate new hangars. Public road access is planned to these hangars. An additional hangar is considered on the Cutter Aviation side.

Two new hangars are considered on the south side of the general aviation area, in proximity to Atlantic Aviation. One large hangar is considered facing the Atlantic Aviation apron. A second, smaller infill hangar is considered slightly to the south.

The current location of the general aviation fuel farm is an issue. It is located on the west side of the Cutter Aviation apron, which makes for a long drive for Atlantic Aviation. The current fuel farm is also located in an area planned for future hangars. Three new locations for general aviation fuel storage have been identified on the exhibit.


Hold Apron
E1
Hangars
Hangars
G
757
737
Heavy Apron
K
E
J
G1
Runway 12-30 6,000' x 150'
Access Road B
Fuel Farm
Hangars
Hangars
Fuel Farm
Fuel Farm
Access Road C
F
Runway 3-21 10,000' x 150'
F1
Heavy Apron
Hangar
LEGEND
Ultimate Building
Ultimate Airfield Pavement
Ultimate Road/Parking
Building to be Removed
Pavement to be Removed from Service
0
400
SCALE IN FEET
Aerial Source: Google Earth 3/9/2014
NORTH

LAND USE PLAN

The objective of airport land use planning is to coordinate uses of airport property in a manner that is both functional with the design of the airport and compatible with the airport environs. There are two primary considerations for on-airport land use planning. The first is to secure those areas essential to the safe and efficient operation of the Sunport, while accounting for applicable FAA design standards and other appropriate planning guidelines. The second is to determine compatible land uses for the balance of the property which would be most advantageous to the Sunport and the community and would represent the highest and best use of the property.

The FAA requires that all federally obligated airports utilize property for aviation purposes first and forecast. If an airport has land that is unlikely to be utilized for aviation purposes because it exceeds that which is forecast to be needed or is inaccessible by aircraft, then these lands may be considered for compatible, non-aviation revenue support development. The revenue from these activities would provide supplemental funds to the airport with the goal of improving an airport's overall financial position.

By categorizing the entirety of airport property, Sunport management can plan and direct any development proposals to appropriate locations. There are three major land use categories on an airport: airfield operations, aviation development, and non-aviation revenue support. The non-aviation revenue support category is only available to those airports with property that is unlikely to be needed or impractical for airfield operations or aviation-related purposes. Often these categories are further subdivided to provide a better understanding of current or intended uses of airport property. **Exhibit 6F** presents the proposed land use classification for the Sunport, each of which is discussed as follows:

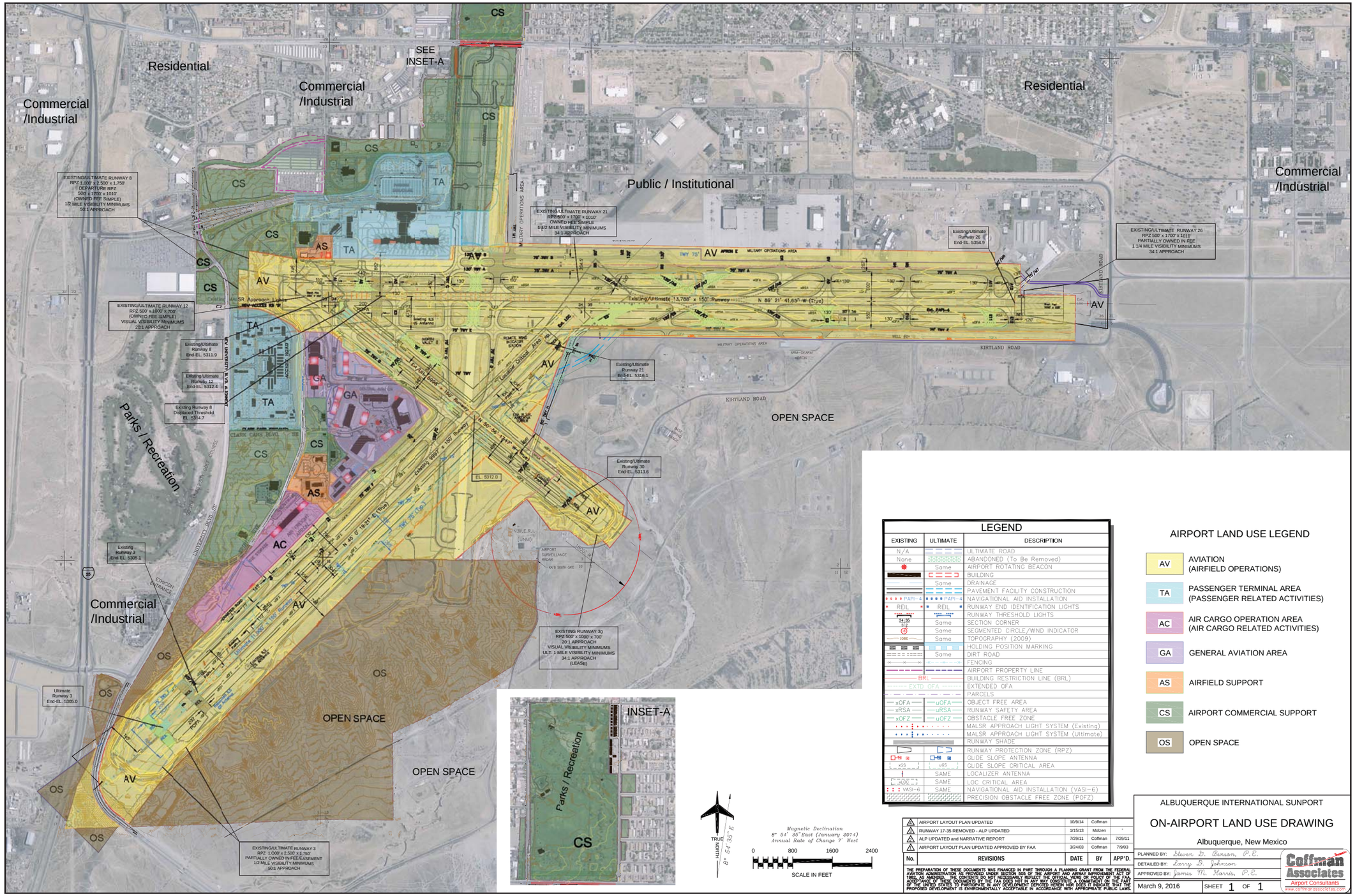
AIRFIELD OPERATIONS

Airfield operations is that portion of airport property that encompasses the major airside elements, such as the runways, taxiways, runway safety area, runway object free area, runway obstacle free zone, runway protection zone (on airport property), taxiway safety area, taxiway object free area, navigational aid critical areas, and the runway visibility zone (where applicable).

Airfield operations is intended for the safe and efficient movement of aircraft to and from the airfield. This land use designation includes the various object clearing areas and only elements necessary for aircraft navigation can be located here.

AVIATION DEVELOPMENT

The Aviation Development land use type includes those areas that should be reserved for development that requires access to the AOA. This might include aircraft hangars, transportation terminals, and air cargo facilities. Any aviation business needing access to the runway and taxiway system could locate in these areas. This land use category has been further subdivided as follows:



LEGEND		
EXISTING	ULTIMATE	DESCRIPTION
N/A		ULTIMATE ROAD
None		ABANDONED (To Be Removed)
Same		AIRPORT ROTATING BEACON
		BUILDING
Same		DRAINAGE
		PAVEMENT FACILITY CONSTRUCTION
PAPI-4	PAPI-4	NAVIGATIONAL AID INSTALLATION
REIL	REIL	RUNWAY END IDENTIFICATION LIGHTS
34.35		RUNWAY THRESHOLD LIGHTS
33.2	Same	SECTION CORNER
Same	Same	SEGMENTED CIRCLE/WIND INDICATOR
1080	Same	TOPOGRAPHY (2009)
		HOLDING POSITION MARKING
Same		DIRT ROAD
		FENCING
		AIRPORT PROPERTY LINE
BRL		BUILDING RESTRICTION LINE (BRL)
EXTD OFA		EXTENDED OFA
		PARCELS
xOFA	uOFA	OBJECT FREE AREA
xRSA	uRSA	RUNWAY SAFETY AREA
xOFZ	uOFZ	OBSTACLE FREE ZONE
		MALSR APPROACH LIGHT SYSTEM (Existing)
		MALSR APPROACH LIGHT SYSTEM (Ultimate)
		RUNWAY SHADE
		RUNWAY PROTECTION ZONE (RPZ)
xGS	uGS	GLIDE SLOPE ANTENNA
		GLIDE SLOPE CRITICAL AREA
	SAME	LOCALIZER ANTENNA
	SAME	LOC CRITICAL AREA
VASI-6	SAME	NAVIGATIONAL AID INSTALLATION (VASI-6)
		PRECISION OBSTACLE FREE ZONE (POFZ)

AIRPORT LAND USE LEGEND

AV	AVIATION (AIRFIELD OPERATIONS)
TA	PASSENGER TERMINAL AREA (PASSENGER RELATED ACTIVITIES)
AC	AIR CARGO OPERATION AREA (AIR CARGO RELATED ACTIVITIES)
GA	GENERAL AVIATION AREA
AS	AIRFIELD SUPPORT
CS	AIRPORT COMMERCIAL SUPPORT
OS	OPEN SPACE

No.	REVISIONS	DATE	BY	APP'D.
1	AIRPORT LAYOUT PLAN UPDATED	10/9/14	Coffman	
2	RUNWAY 17-35 REMOVED - ALP UPDATED	1/15/13	Molzen	-
3	ALP UPDATED and NARRATIVE REPORT	7/29/11	Coffman	7/29/11
4	AIRPORT LAYOUT PLAN UPDATED APPROVED BY FAA	3/24/03	Coffman	7/9/03

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

ON-AIRPORT LAND USE DRAWING

Albuquerque, New Mexico

PLANNED BY: Steven B. Benson, P.E.
DETAILED BY: Larry B. Johnson
APPROVED BY: James M. Harris, P.E.

March 9, 2016 | SHEET 1 OF 1

Coffman Associates
Airport Consultants
www.coffmanassociates.com

This page intentionally left blank

Passenger Terminal Area: The passenger terminal area is well defined. It encompasses the terminal building, the vehicle parking structure and surface lots, and the terminal aircraft apron. This designated area includes enough space to accommodate long-term growth potential.

Airport Support Services Area: This land use designation encompasses the variety of services necessary for operating an airport including the fuel farm, maintenance facilities, the SRE barn, glycol storage, triturater, and other waste collection.

General Aviation Area: The general aviation area is also well defined at the Sunport. It includes the FBO facilities, aircraft aprons, and other general aviation support services.

Air Cargo Operations Area: The air cargo area is located southwest of the general aviation area. There is a dedicated sort facility and aircraft apron.

NON-AVIATION/COMMERCIAL SUPPORT

This land use classification includes development that is compatible with aviation activities but is unlikely to require access to the runway and taxiway system. Typically, it is preferable that activities in these areas complement airport activities to some degree, but that is not required. Examples of potential uses include research facilities, laboratories, manufacturing and processing facilities, warehouses, and other facilities compatible with an airport environment.

The current City Administration has initiated more interaction with adjoining land use planning to create a high-tech corridor that extends from the Veterans Administration Hospital at Kirtland AFB on the north side of the Sunport to Mesa Del Sol south of the Sunport.

As presented previously, there are several parcels owned by the Sunport that have been identified for non-aviation development. An in-depth analysis of these properties was previously presented and is summarized here. **Exhibit 6G** graphically presents each of these parcels.

Aviation Center of Excellence: With the closure of Runway 17-35, approximately 75 acres of land just northeast of the terminal complex became available for redevelopment. The City of Albuquerque has initiated a project called Destination Sunport to promote the area as an emerging business hub supporting collaboration among Albuquerque's research and development community and the global marketplace. The centerpiece of Destination Sunport is the Aviation Center of Excellence (ACE). ACE is planned to accommodate strategic aerospace and aviation innovations and partnerships. Destination Sunport will also host The Landing, a convenience retail and restaurant development at the north end of the site adjacent to Gibson Boulevard.

The City Aviation Department plans on long-term ground leases with developers, which provides the benefit of lower upfront capital requirements. The property has direct access to the Sunport's airfield, which will provide tenants with access and connectivity. Commercial uses are strategically located along

Gibson Boulevard to serve surrounding communities, as well as ACE workers, Kirtland AFB, and others commuting along Gibson Boulevard. The office/R&D and aviation-related development will be located farther south on the property.

The Site Plan for Subdivision for the property was approved in 2014 by the Environmental Planning Commission. Subsequent Site Development Plans for Building Permit for each development project is delegated to the City's Design Review Team (DRT) provided they are consistent with the Site Plan for Subdivision Design Standards. In addition to the City Planning Department's approval process, all buildings, structures, and site plans for projects at the ACE property shall be reviewed and approved by the ACE Architectural Control Committee (ACC).

The site plan approval process for the ACE project has been completed. The City Aviation Department can proceed with plans to lease the land to developers. A key component of the Site Plan for Subdivision is the provision for an expedited approval process for future Site Plans for Building Permit through the City's DRT. The planned development includes commercial/retail along Gibson Boulevard, Office/Research and Development in the central portion, and aviation related on the south portion with taxiway access to the airfield. Limited access (right-in, right-out, left-in) is allowed from Gibson Boulevard to the ACE site. Since this development plan is already established, no additional land use alternatives were considered.

Puerto del Sol Golf Course: This 72-acre site is located along the north side of Gibson Boulevard. It is currently leased to the City Parks and Recreation Department for use as a municipal golf course. Originally, the golf course was developed as a land use compatible with the runway protection zone for former Runway 17-35. Now that Runway 17-35 is closed, there is no longer an RPZ. Therefore, consideration was given to alternative long-term plans for the property. The existing zoning for the subject property is SU-1 for Golf Course and Related Facilities.

Following review by the Sustainable Master Plan Committee and the public, it is recommended the property remain a public golf course producing revenue for the airport fund for at least ten years until the ACE project is built-out. At that time, the property should be reviewed again to determine its highest and best use. While not currently planned, should the Aviation Department ever consider selling the property, the sale would require FAA approval and all funds generated must go to the Aviation Fund.

Sunport Business and Technology Center: This 65-acre site is located to the east of University Boulevard, west of Spirit Drive, and south of Clark Carr Road. It currently has a limited amount of development on the property, including existing airline operations on a five-acre leased area and manufacturing on a 1.5-acre leased area. A Master Development Plan was approved by the Environmental Planning Commission for this property in 2008, which was also designated by the City Council as a Foreign Trade Zone. The Master Development Plan showed a north-south roadway through the center of the property, but it was situated to the west of center. The lease areas were shown as a series of 17 small one to three-acre lease areas, which limits development on this property particularly considering the topography and grade change from University Boulevard.

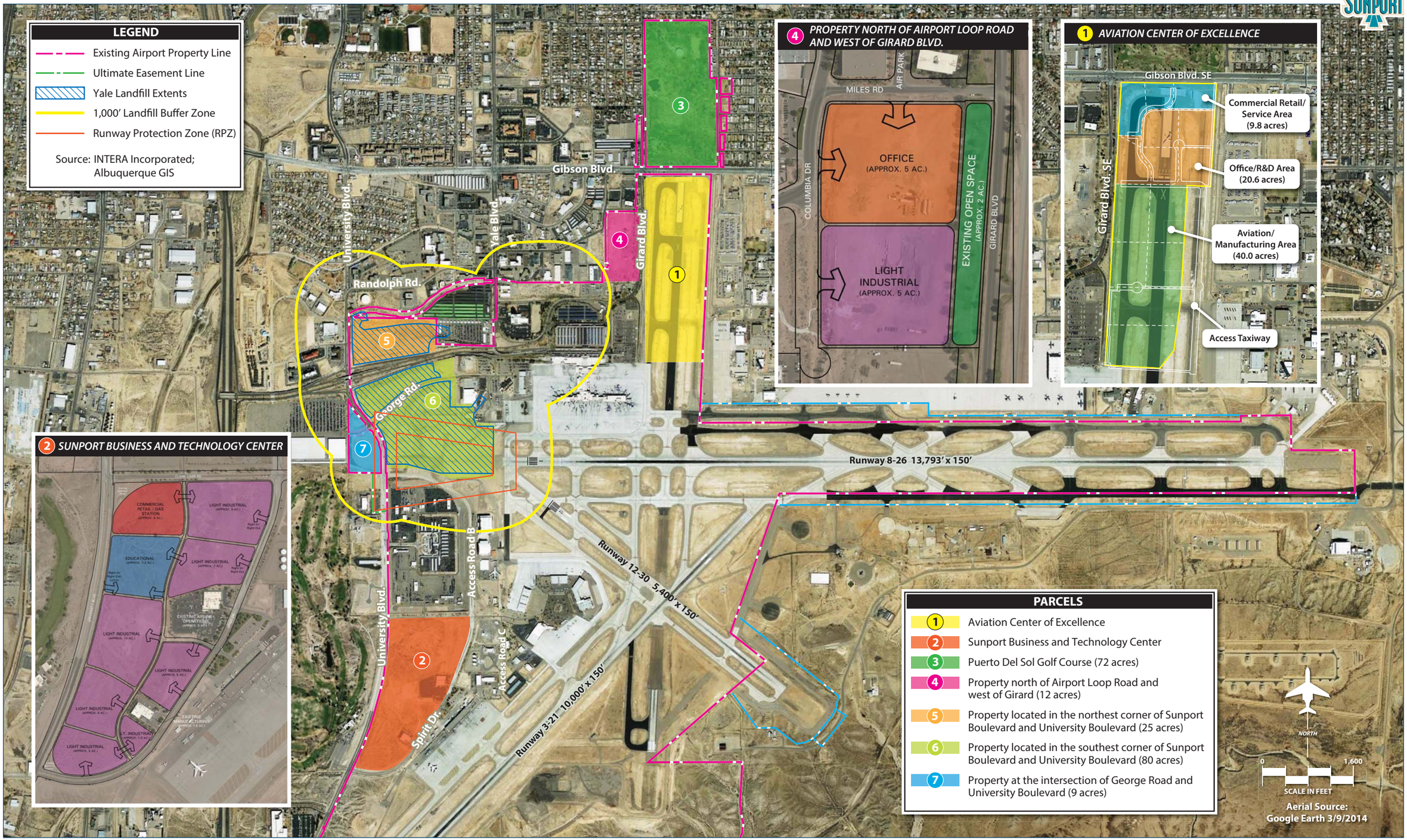

LEGEND
Existing Airport Property Line
Ultimate Easement Line
Yale Landfill Extents
1,000' Landfill Buffer Zone
Runway Protection Zone (RPZ)
Source: INTERA Incorporated; Albuquerque GIS
4 PROPERTY NORTH OF AIRPORT LOOP ROAD AND WEST OF GIRARD BLVD.
MILES RD
AIR PARK
COLUMBIA DR
OFFICE (APPROX. 5 AC.)
LIGHT INDUSTRIAL (APPROX. 5 AC.)
EXISTING OPEN SPACE (APPROX. 2 AC.)
GIRARD BLVD
1 AVIATION CENTER OF EXCELLENCE
Gibson Blvd. SE
Girard Blvd. SE
Commercial Retail/ Service Area (9.8 acres)
Office/R&D Area (20.6 acres)
Aviation/ Manufacturing Area (40.0 acres)
Access Taxiway
2 SUNPORT BUSINESS AND TECHNOLOGY CENTER
COMMERCIAL RETAIL / GAS STATION (APPROX. 8 AC.)
LIGHT INDUSTRIAL (APPROX. 5 AC.)
EDUCATIONAL (APPROX. 7.5 AC.)
LIGHT INDUSTRIAL (APPROX. 7 AC.)
EXISTING AIRLINE OPERATIONS (APPROX. 5 AC.)
LIGHT INDUSTRIAL (APPROX. 10 AC.)
LIGHT INDUSTRIAL (APPROX. 5 AC.)
LIGHT INDUSTRIAL (APPROX. 8 AC.)
EXISTING MANUFACTURING (APPROX. 1.5 AC.)
LT. INDUSTRIAL (APPROX. 1.5 AC.)
LIGHT INDUSTRIAL (APPROX. 5 AC.)
Gibson Blvd.
University Blvd.
Yale Blvd.
Girard Blvd.
Randolph Rd.
George Rd.
Spirit Dr.
Access Road B
Access Road C
Runway 8-26 13,793' x 150'
Runway 12-30 5,400' x 150'
Runway 3-21 10,000' x 150'
PARCELS
1 Aviation Center of Excellence
2 Sunport Business and Technology Center
3 Puerto Del Sol Golf Course (72 acres)
4 Property north of Airport Loop Road and west of Girard (12 acres)
5 Property located in the northest corner of Sunport Boulevard and University Boulevard (25 acres)
6 Property located in the southest corner of Sunport Boulevard and University Boulevard (80 acres)
7 Property at the intersection of George Road and University Boulevard (9 acres)
NORTH
0
1,600
SCALE IN FEET
Aerial Source: Google Earth 3/9/2014

Exhibit 6G
NON-AVIATION LAND USE PLAN

This page intentionally left blank

An updated analysis of the property was conducted as part of this Master Plan and revisions are proposed. The north-south internal road is realigned to the east to provide more depth to the lease areas facing University Boulevard due to the topography challenges. As such, development of these lease areas would likely show a low floor area ratio. The internal road provides access to each of the eight proposed lease areas. Land uses include commercial retail, light industrial, and educational.
A commercial parcel, approximately six acres in size, is located at the northwest corner of the property along Clark Carr Road. It is across the street from the Sunport car rental facility. Due to its proximity, this portion of the property would be a good location for a gas station/convenience store.

To the south of the commercial area is a 7.5-acre parcel suggested for educational uses. Visibility and access from University Boulevard are important for this use. Thus, a limited access (right-in/right-out/left-in) from University Boulevard is shown. To provide this access, retaining walls would be required on both sides of the proposed driveway. The remainder of the site is recommended for light industrial parcels in variety of lease area sizes ranging from five to 10 acres.

Property West of ACE: This 12-acre site is located to the south of Miles Road and west of Girard Boulevard. It is to the west of the ACE project and is envisioned as an extension of that project. As airport property, development is subject to applicable FAA regulations. Development of this property will require a Site Development Plan to be approved by the EPC. Depending on whether there is an end user, a Site Plan for Building Permit could either be processed simultaneously with the Site Plan for Subdivision or be submitted as a follow-up action later by the end user. Once a Site Plan for Subdivision is approved, delegation of future Site Plans for Building Permit could be requested for delegation to the Development Review Board (DRB) for an expedited approval process.

The previous Sunport Master Plan envisioned utilizing this property (and the ACE property) to support a new Sunport terminal building. Since this concept is not being carried through to this Master Plan, a new development alternative is considered.

The plan being considered shows one parcel each for office and light industrial uses and maintains the two-acre green space which currently contains a multi-use trail running north-south along the east edge of the property. The office use is located on the northern five acres of the site, across Girard from the existing Airport Business Park. Access to the office area is primarily from Miles Road via Girard Boulevard and is shown to align with Air Park Road. Secondary access to the office area may be available from the existing Columbia Drive. The light industrial area is located on the southern five acres of the site. Secondary access would be available via an extension from the existing Columbia Drive to the south. The extension is currently platted, but it has not been constructed.

Property Located in the Northeast Corner of Sunport and University Boulevards: This 25-acre parcel is part of former Yale Landfill (1948-1965) and is located within a designated landfill buffer zone.
Future uses on this site that require the least remediation include a solar farm and parking lot. Solar farm projects will require a Glint and Glare Study to assess the feasibility of this use. These uses will need to address the issue of a continuous settling. Mitigation through dynamic compaction has been determined insufficient by the City of Albuquerque Environmental Health Department.

All development within the landfill buffer is subject to the City of Albuquerque's Interim Guidelines for development within City-designated landfill buffer zones. This requires:

1) Review of a proposed project by the City's Environmental Health Department Environmental Services Division,
2) Input from a professional engineer with expertise in landfills to determine if landfill gas exists on the property, and
3) If landfill gas is present at the subject property, plans for development must include risk abatement measures which are adequate to address any existing or future risk.

These abatement measures must be certified by a professional engineer and signed off on by designated Albuquerque Environmental Health Services Division staff. (See "Yale Landfill – Development Potential" for additional information.)

Property Located in the Southeast Corner of Sunport and University Boulevards: This 80-acre parcel is part of former Yale Landfill (1948-1965) and is located within a designated landfill buffer zone. All development within the landfill buffer is subject to the City of Albuquerque's Interim Guidelines for development within City-designated landfill buffer zones as described above.

Future uses on this site that require the least remediation include a solar farm and parking lot. Solar farm projects will require a Glint and Glare Study to assess the feasibility of this use. These uses will need to address the issue of a continuous ground settlement. Mitigation through dynamic compaction has been determined insufficient by the City of Albuquerque Environmental Health Department.

Property Located at the Intersection of George Road and University Boulevard: This 9-acre parcel is located just west of the Yale Landfill and within the Landfill Buffer Zone. Options for future uses on this site are greater than those available for properties located in the northeast and southeast corners of Sunport Boulevard and University Boulevard. However, this site is subject to special City review due to its location within a Landfill Buffer Zone. Through normal decomposition of buried refuse in former landfills, landfill gases may be produced as a byproduct. Landfill gases may migrate to offsite areas surrounding a landfill. As a result, this property will require special consideration of any impact from the former Yale Landfill.

The original site will be reduced by the relocated RPZ resulting from moving the Runway 8 landing threshold farther west. Future uses on this site could accommodate a travel center. A detention pond on the northern triangular portion of the property is needed for stormwater purposes.

SUSTAINABILITY PERFORMANCE TARGETS

For the City of Albuquerque Aviation Department to better gauge and measure its sustainability performance and to drive progress towards achieving the identified sustainability goals and objectives, it is necessary to identify quantifiable performance targets. Multiple performance targets, which are tied to the planning horizons of this Master Plan, have been identified for each resource category. Establishment of these performance targets is based upon numerous sources including trends and conditions

identified in the baseline assessment, the Sunport *Sustainable Management System Reference* document, the *Energy Audit Report*, the *CABQ Aviation Department Water Use Report and Conservation Plan Update*, as well as industry-wide sustainability efforts including environmental goals set by the Airports Council International – North America[1] (ACI-NA), of which the Sunport is a member.

Key performance indicators (KPIs) are the specific, results-based, metrics that allow the Aviation Department to gauge sustainability performance and progress towards overall goals. If KPIs are trending positively towards the overall goal, this indicates the specific initiatives that have been put into place are producing desired results; however, if KPIs trend negatively, then this is an indication that the Aviation Department needs to refocus on that specific area and identify opportunities for improvement. Most KPIs should be tracked on a regular (monthly/yearly) basis so that trends can be identified regarding program performance.

Sustainability performance targets and KPIs are outlined in **Table 6A**. The primary intent of this effort is to set targets that are realistic and achievable, but still push the Aviation Department to make significant strides toward improving the sustainability performance of the Sunport. Summaries for each resource category are provided below.

WASTE MANAGEMENT AND RECYCLING

The Aviation Department's existing waste handling program includes recycling of paper, plastic, and aluminum cans/bottles and regular solid waste removal as well as green waste removal from landscaped areas. The recycling program is focused primarily on the passenger terminal building where stainless-steel recycling bins are co-located with solid waste bins. The Aviation Department is already planning a terminal improvement project to replace all solid waste and recycle bins with single stations for solid waste and recycling that will result in fewer receptacles but better coverage. Once these new stations are in place, the Aviation Department should conduct waste audits at least every two years to measure the performance of their recycling programs.

A waste audit can be a simple examination of waste service provider invoices, which report removed solid waste and recycled material weights. A more detailed waste audit can also be performed to give more specific data on what recyclable materials are being generated in the various areas of the Sunport as well as amounts of recyclable or compostable materials that are not being diverted from the landfill. For this more detailed audit, a collaboration with a local educational facility such as the University of New Mexico could be established to use the waste audit process as an educational tool for students.

The Sunport is currently served by eight airlines, of which only Southwest Airlines participates in the Sunport's recycling program. Deplaned waste can be a significant source of solid waste and for this reason, a performance target has been set to engage the airlines and achieve 100 percent participation in recycling by 2020.

[1] For more information on ACI-NA Environmental Goals visit: http://aci-na.org/sites/default/files/environmental_goals-1_pager.pdf

TABLE 6A
Sustainability Performance Targets
Albuquerque International Sunport

Targets	Key Performance Indicators
Goal 1. Expand the Sunport's existing waste management program to divert more waste from landfills through increased recycling, composting, and procurement policies.	
Conduct biennial waste audits. 100% participation by airlines in recycling program by 2020. 100% participation by terminal food concessions in food waste composting by 2025.	Weight (tons) of recycled materials/solid waste/composted materials Number of airlines participating in recycling program Number of food concessions participating in food waste composting program
Goal 2. Expand energy efficiency measures and renewable energy opportunities.	
Incorporate all recommended energy efficiency measures (EEMs) by 2025. Retrofit rental car photovoltaic (PV) system by 2025. Construct credit card parking lot PV system by 2030. Expand PV capacity to achieve net-zero energy use for all Aviation Department facilities (100% on-site renewables) by 2035.	Energy use (kWhs)/month On-site energy generation (kWhs)/month Energy costs ($)/month
Goal 3. Commit to the betterment of regional air quality by supporting efforts to reduce greenhouse gas emissions from Sunport users and enacting policies to reduce emissions from Aviation Department controlled sources.	
Prepare annual greenhouse gas (GHG) emissions reports. Achieve carbon-neutral growth from 2020 emissions levels for airport-controlled sources. Transition to all-electric ground support equipment (GSE) by 2025. Transition to 100% alternative fuel/low-emission fleet vehicles by 2035.	GHG emissions/year % of low/no emission equipment Number of alternative fuel/low-emission fleet vehicles Fuel usage by GSE and fleet vehicles/month
Goal 4. Reduce potable water consumption throughout the Sunport with expanded efficiency measures and reclaimed/grey water use.	
Replace all outdated fixtures in Aviation Department-controlled facilities by 2020. Install sub-metering for all concessionaires, cooling equipment, restrooms, and irrigation on mixed-use meters by 2025. Utilize 100% reclaimed/grey water for all landscape irrigation by 2025. Reduce average indoor water use per passenger from 2014 levels by 50 percent by 2030 - (1.0 gallons per passenger)	Water use/month (per passenger) Reclaimed/grey water use/month Water costs/month (per passenger) Number of sub-meters installed
Goal 5. Promote the utilization and expansion of alternative transportation modes to and from the Sunport.	
Conduct annual surveys of Aviation Department, Sunport tenant employees, and passengers to identify travel modes. Install electric vehicle (EV) charging stations in the public parking areas by 2020. Implement priority parking spaces for carpools and alternatively fueled vehicles by 2020. Install on-site end-of-trip bicycle facilities for employees by 2025. Construct alternative refueling station by 2035.	Annual employee/passenger survey results Number of EV stations available Number of priority parking spaces for carpools and alternatively fueled vehicles Alternative fuel usage/month
Goal 6. Incorporate procurement and construction policies to prioritize the use of more sustainable resources.	
Establish a "Green" Procurement Program by 2020. Implement a "Green" Concessions Policy by 2020. Implement construction policy by 2020 to commit to LEED or equivalent design standards for all new major construction or renovation projects when applicable.	Annual expenditures on purchases of sustainable and/or locally sourced materials. Number of concessionaires committed to the "Green" Concessions Policy Number of construction/renovation projects that include sustainable elements.

An on-site composting facility processes green waste removed from landscaped areas of the Sunport. Composting uses aerobic decomposition to degrade organic material, resulting in a product that can be used as a soil enhancer. Food waste, another significant source of waste and contributor towards greenhouse gas emissions, needs to be targeted for landfill diversion by expanding composting efforts to include food waste from terminal food service providers. Black Mesa Coffee Company has already expressed interest in composting its used coffee grounds. Other airports that have implemented food waste composting programs have dramatically increased solid waste diversion from landfills. Therefore, a performance target has been set to achieve 100 percent participation by terminal food service providers in a food waste composting program by 2025.

ENERGY

The *Energy Audit Report* (Appendix E) prepared by Quest Energy Group outlined various energy efficiency measures and renewable energy expansion opportunities for the Sunport. The recommended energy efficiency measures (EEMs) include:

- Installing new condensing boilers (current project)
- Replacing airfield lighting with LED fixtures
- Implementing lighting retrofit opportunities throughout the Sunport
- Controls optimization for HVAC systems
- High efficiency HVAC filters
- Data center efficiency updates
- Install external shading devices or window films for the terminal's south and west facing windows to improve thermal comfort and to save energy.

The first performance target for the energy category is to implement each of these EEMs by 2025.

Beyond the EEMs, the Sunport can take advantage of its existing on-site renewable energy centers and expand upon them. The current photovoltaic (PV) systems at the Sunport generate approximately 2,480,000 kilowatt hours (kWh) of energy each year. The Energy Audit Report outlines several expansion opportunities that would help the Sunport achieve net-zero energy use. The expansion opportunities described below will serve as additional performance targets for the Sunport.

- Retrofit rental car photovoltaic (PV) system by 2025 – expands total Sunport PV generation by 12 percent (294,800 kWhs)
- Construct credit card parking lot PV system by 2030 – expands total Sunport PV generation by 67 percent (1.9 million kWhs).
- Expand PV capacity to achieve net-zero energy use for all Aviation Department facilities (100% on-site renewables) by 2035 – expands Sunport PV generation by 180 percent (8.5 million kWhs)

The site under consideration for the 8.5 million kWh expansion is the property located in the northeast corner of Sunport and University Boulevards shown in the aerial photo below. This site is part of the former Yale Landfill (1948-1965), which has designated a solar farm as a use that would require the least amount of remediation. Any new on-site solar expansion projects undertaken at the Sunport will require a Glint and Glare Study to assess the feasibility of the site to ensure the PV systems do not create reflectivity and communication systems interferences.

Potential Solar Farm Expansion Site (8.5 million kWh)

AIR QUALITY AND GREENHOUSE GAS (GHG) EMISSIONS

As detailed in the baseline assessment, GHG emissions at the Sunport come from a variety of sources, many of which are outside the direct control of the Aviation Department. As a result, the performance targets are focused on those sources (Scope 1 sources: Aviation Department fleet vehicles and building energy use) under direct control of the Aviation Department.

The first target is to continue to prepare annual GHG emission reports, which the Aviation Department began preparing in recent years. These annual reports should identify the various sources and levels of GHG emissions so that trends can be established.

The second performance target is a directive from the ACI-NA Environmental Goals for member airports. These goals were originally developed in 2008 and were updated and approved by the ACI-NA Board of Directors at the 2015 Annual Conference & Exhibition. The specific goal set forth by ACI-NA is for member airports to implement a GHG reduction management program/plan to achieve carbon-neutral growth from 2020 emissions levels for airport-controlled sources. Therefore, this goal has been adopted as a performance target for the Sunport.

The Aviation Department has already taken advantage of the FAA's Voluntary Airport Low Emission (VALE) grant program, which provides AIP grant funding to airports located in non-attainment areas for criteria pollutants for projects such as replacing high-emitting equipment or vehicles with low-emission equipment or vehicles. VALE funding at the Sunport has gone towards acquiring an all-electric Chevy Volt fleet vehicle along with a charging station for that vehicle and the installation of the Sunport's PV systems. Additional projects undertaken by the Sunport to improve air quality include the installation of all-electric auxiliary power units (APUs), and the Sunport is currently considering a VALE project to implement solar hot water heaters for the terminal building. To build from these efforts, the remaining performance targets for this category are to transition to all-electric ground support equipment (GSE) by 2025 and to transition to 100 percent alternative fuel/low-emission fleet vehicles by 2035.

Electric Ground Support Equipment and Charging Stations at Seattle-Tacoma International Airport
Source: www.airalaska.com

Due to improvements in air quality in Bernalillo County, it is possible that the Sunport may no longer qualify for VALE grant funding in the future. Therefore, the Aviation Department should take maximum advantage of this program while it remains qualified. The Aviation Department may also take advantage of the FAA's Zero Emissions Airport Vehicle (ZEV) grant program, which also distributes funds for projects that improve air quality and reduce GHG emissions.

WATER CONSERVATION AND WATER QUALITY

The performance targets for the water conservation and water quality resource category were derived primarily from the *Water Use Report and Conservation Plan* (Appendix D). The City of Albuquerque adopted a water conservation ordinance in 1995 intended to reduce water use by large water users such as the Sunport. As a result, the Aviation Department has already undergone renovations to restroom facilities throughout the terminal to install low-flow fixtures. The first performance target aims to continue that effort and replace all outdated fixtures in Aviation Department-controlled facilities by 2020. According to the *Water Use Report and Conservation Plan*, restroom fixtures (toilets, faucets, showers and urinals) in the terminal and all other Aviation Department buildings that need to be upgraded include 446 fixtures. This upgrade effort should also target kitchen-use facilities in the terminal, which can convert conventional equipment to high-efficiency equipment including dishwashers, steamers, ice makers, and ice cream wells.

Understanding where water use is occurring is vital to understanding and developing strategies to reduce water consumption. For this reason, sub-metering of Aviation Department facilities, most notably the terminal building, should be a priority. Installing sub-meters at the terminal for all concessionaires and tenants by 2025 and monitoring them will help the Aviation Department better understand where water is consumed and aid in targeting large water users. Furthermore, there are several mixed-use meters at the Sunport that are both building and irrigation use. Separating these uses with sub-meters will again help the Aviation Department categorize its water use areas.

The Sunport consumed approximately 51.7 million gallons (mg) of water for landscape irrigation, which accounted for approximately 86 percent of all Sunport water consumption in 2014. Improvements have been made to landscaped areas to reduce irrigation water use; however, additional progress can still be made. A reclaimed water line is currently located next to or within 500 feet of most irrigation meters at the Sunport. To utilize this reclaimed water at the Sunport, a booster pump is needed to increase the water line pressure making it suitable for irrigation use. In addition to the reduction of potable water use for irrigation, reclaimed water is charged at a rate of 80 percent of the potable water rate (not including fixed monthly charges), so transitioning to reclaimed water use for irrigation would result in a significant cost savings for the Aviation Department as well. Therefore, a performance target has been set to utilize 100 percent reclaimed water for all landscape irrigation by 2025.

City of Burbank Recycled Water Use Signage
Source: http://www.nbcnews.com/science/environment/many-u-s-face-another-dry-year-world-water-day-n327446

With the installation of low-flow fixtures and improved sub-metering, the Sunport should set a performance target to reduce terminal potable water use per passenger by 50 percent below 2014 levels by 2030. In 2014, the terminal consumed 1.99 gallons of potable water per passenger (gpp). This performance target aims to achieve 1.00 gpp by 2030. Achieving this target should be within reach with the incorporation of the proposed efficiency measures and sub-metering efforts.

SURFACE TRANSPORTATION

Surface transportation is one of the more difficult resource categories to affect change since passengers traveling with luggage are likely to choose the most convenient transportation mode, personal vehicles, over less convenient transportation modes such as public transportation, bicycles, or walking. The first performance target for this resource category is to implement annual passenger and employee surveys to establish travel mode trends. This survey effort can be incorporated into passenger and employee satisfaction surveys to develop a better understanding of how visitors view their overall Sunport experience.

Additional performance targets developed for this resource category are focused on providing facilities and equipment that might incentivize alternative transportation use. By 2020, the Sunport should undergo projects to install electric vehicle (EV) charging stations in premium locations that are free for

Electric Vehicle Charging Station at John F. Kennedy International Airport
Source: http://www.panynj.gov/airports/jfk-electric-vehicle-charging-stations.html

public use, and designate priority parking spaces in premium locations for carpools and other alternatively fueled vehicles. By 2025, the Sunport should construct on-site, end-of-trip bicycle facilities for Sunport employee use. These facilities can include lockers, showers, and bicycle storage facilities. Finally, by 2035, the Sunport should coordinate with on-site travel centers to incorporate alternative fuel options such as compressed natural gas (CNG), biodiesel, EV stations, hydrogen, liquefied natural gas (LNG), and other emerging technologies as they become available and mass marketed.

NATURAL RESOURCE MANAGEMENT

The focus of the natural resource management resource category is on incorporating new Aviation Department policies and processes to efficiently utilize materials and resources consumed at the Sunport. The Sunport's *Sustainable Management System Reference Document* (Appendix C) has laid out numerous improvements to address resource conservation, and those action items that have not yet been incorporated have been made into performance targets. By 2020, the Sunport should work to implement a "green" procurement program and a "green" concessions policy. The procurement program should set priorities for purchasing materials with recycled content, locally sourced materials, as well as Energy Star certified equipment when possible. A "green" concessions policy will provide concessionaires with guidance and standards for minimizing waste, enhancing recycling, generating demand for eco-friendly products, and providing healthier foods for passengers and employees such as Fair-Trade Certified™ or United States Department of Agriculture (USDA) Certified Organic food products[2].

Construction policies should also be put in place by 2020, committing the Aviation Department to design and build any major construction or renovation projects to Leadership in Energy and Environmental Design (LEED) or equivalent standards. This commitment will produce more sustainable components and techniques resulting in smaller environmental footprints.

[2] For more information on Fair-Trade Certified foods, visit: http://fairtradeusa.org/what-is-fair-trade. For more information on USDA Certified Organic food, visit: http://www.usda.gov/wps/portal/usda/usdahome?contentidonly=true&contentid=organic-agriculture.html

LEED Resource Categories
Source: http://www.bee-inc.com/blog/how-leed-certification-can-be-even-so-much-better-for-green-building/

SUMMARY

The recommended master plan concept presents a long-term vision for the Sunport. The major elements of that vision include mitigating for the airfield hot spots, identification of airfield pavement that may be considered excess, mitigation of taxiway geometry issues, extension of concourse B of the terminal building, future expansion of the air cargo apron and building, and hangar development in the general aviation area.

This recommended master plan concept documents a change in direction for the Sunport. The previous Master Plan was completed at a time when forecast growth was significantly higher. Resulting from the trends at the time, a major expansion of the terminal building was in the plan. Since that time, aviation demand, as measured in enplanements, declined significantly until 2015. Current trends show a return to growth; however, the new forecasts indicate that the existing terminal building can accommodate that growth with lesser improvements. As a result, the previous plan to utilize the space created by the closure of Runway 17-35 for a new terminal facility has been replaced with a plan to develop that property.

Now that a recommended master plan alternative has been developed, the next chapter will present a capital improvement program (CIP) and identify estimated costs and potential funding sources.

Chapter Seven

CAPITAL IMPLEMENTATION PLAN

ABQ INTERNATIONAL SUNPORT

Sustainable Airport Master Plan

Chapter Seven

CAPITAL IMPLEMENTATION PLAN

The analyses completed in previous chapters evaluated development needs at the Sunport over the next 20 years and beyond, based on forecast activity and operational efficiency. The next step is the development of a capital improvement plan (CIP) for those projects that are expected to be implemented over the short-term. A more general discussion of the funding for the intermediate- and long-term projects is provided because of the possible shifts in the priority of those projects over time. While the plan is demand-based, the CIP is developed under the assumption that various aviation demand indicators, such as annual operations, annual passenger enplanements, and based aircraft grow as forecast. Other projects related to major pavement maintenance or meeting FAA design standards are also included. Although activity rarely grows exactly as forecast in the master plan, establishing triggers for key improvements will allow the Sunport to respond to activity levels to better meet projected demand.

The CIP is organized into two sections. The first section includes a discussion of the various capital improvement funding sources on the federal, state, and local levels. The second section presents the Sunport development schedule and cost summaries in graphic and narrative form.

CAPITAL IMPROVEMENT FUNDING SOURCES

There are generally four sources of funds used to finance airport capital development projects: airport cash flow, revenue/general obligation bonds, federal/state/local grants, and passenger facility charges (PFCs), which are reserved for commercial service airports. Access to these sources of financing varies widely among airports, with some large airports maintaining substantial cash reserves and most small

commercial service and general aviation airports often requiring subsidies from their sponsors (local and state governments) to fund operating expenses and to finance modest improvements.

Financing capital improvements at the Sunport will not rely solely on the financial resources of the Sunport. Capital improvement funding is available through various grant-in-aid programs on both the state and federal levels. While some years more funds could be available, the CIP was developed with project phasing in order to appropriately space projects. The following discussion outlines key sources of funding potentially available for capital improvements at the Sunport.

FEDERAL GRANTS

Through federal legislation over the years, various grant-in-aid programs have been established to develop and maintain a system of public use airports across the United States. The purpose of this system and its federally based funding is to maintain national defense and to promote interstate commerce. The most recent legislation affecting federal funding was enacted on February 17, 2012 and is titled, the *FAA Modernization and Reform Act of 2012*.

Some Sunport projects are eligible for FAA funding through the Airport Improvement Program (AIP), which provides entitlement funds to airports based, in part, on their annual enplaned passengers and pounds of landed cargo weight. Additional AIP funds, designated as discretionary, may also be used for eligible projects, based on the FAA's national priority system. Although the AIP has been reauthorized several times and the funding formulas have been periodically revised to reflect changing national priorities, the program has remained essentially the same. Public use airports that serve civil aviation, like the Sunport, may receive AIP funding for eligible projects, as described in FAA's *Airport Improvement Program Handbook.* The Sunport must fund the remaining project costs using a combination of other funding sources, as discussed further below.

The law that authorized the AIP at $3.35 billion for fiscal years 2012 through 2016, has been extended through 2017. Eligible airports, which include those in the *National Plan of Integrated Airport Systems* (NPIAS), such as the Sunport, can apply for airport improvement grants. **Table 7A** presents the approximate distribution of the AIP funds. Currently, the Sunport is eligible to apply for grants which may be funded through several categories.

Funding for AIP-eligible projects is undertaken through a cost-sharing arrangement in which the FAA share varies by airport size and is generally 75 percent for large and medium hub airports and 90 percent for all other airports. Since the early days of federal participation in airport infrastructure projects, Congress has provided a higher federal share for airports located in states with more than five percent of their geographic acreage comprised of public lands and nontaxable Indian lands. For states that qualify, such as New Mexico, with 26.44 percent public/Indian lands, the federal share is increased depending on the airport classification. As a medium hub commercial service airport, the federal share of eligible capital improvement projects for the Sunport is up to 84.29 percent. In exchange for this level of funding,

the Sunport sponsor is required to meet various Grant Assurances, including maintaining the improvement for its useful life, usually 20 years.

TABLE 7A
Federal AIP Funding Distribution

Funding Category	Percent of Total	Funds*
Apportionment/Entitlement		
Passenger Entitlements	29.19%	$977,865,000
Cargo Entitlements	3.00%	$100,500,000
Alaska Supplemental	0.65%	$21,775,000
State Apportionment for Nonprimary Entitlements	10.35%	$346,725,000
State Apportionment Based on Area and Population	9.65%	$323,275,000
Carryover	10.77%	$360,795,000
Small Airport Fund		
Small Hubs	1.67%	$55,945,000
Nonhubs (i.e., MRY)	6.68%	$223,780,000
Nonprimary (GA and Reliever)	3.34%	$111,890,000
Discretionary		
Capacity/Safety/Security/Noise	11.36%	$380,560,000
Pure Discretionary	3.79%	$126,965,000
Set Asides		
Noise	8.40%	$281,400,000
Military Airports Program	0.99%	$33,165,000
Reliever	0.16%	$5,360,000
Totals	100.00%	$3,350,000,000

* FAA *Modernization and Reform Act of 2012*
AIP: Airport Improvement Program
Source: FAA Order 5100.38D, Airport Improvement Program Handbook

The source for AIP funds is the Aviation Trust Fund. The Aviation Trust Fund was established in 1970 to provide funding for aviation capital investment programs (aviation development, facilities and equipment, and research and development). The Aviation Trust Fund also finances the operation of the FAA. It is funded by user fees, including taxes on airline tickets, aviation fuel, and various aircraft parts.

Apportionment (Entitlement) Funds

AIP provides funding for eligible projects at airports through an apportionment (entitlement) program. Primary commercial service airports receive a guaranteed minimum level of federal assistance each year, based on their enplaned passenger levels and Congressional appropriation levels. A primary

Primary commercial service airports receive a guaranteed minimum level of federal assistance each year, based on their enplaned passenger levels, through the Airport Improvement Program.

airport is defined as any commercial service airport enplaning at least 10,000 passengers annually.

An airport enplaning 10,000 or more passengers annually will receive the higher of $1,000,000 or an amount based upon the entitlement formula. The entitlement formula is $7.80 per enplaned passenger for the first 50,000 enplanements, and $5.20 per enplanement for the next 50,000 enplanements. The next 400,000 enplanements provide $2.60 each, and an airport receives $0.65 for the next 500,000 enplanements. For each annual enplanement above one million, the airport receives $0.50.

Under the authorizing statute, individual entitlements are doubled (with a maximum of $26 million and a minimum of $1.0 million per airport sponsor) if Congressional AIP funding in a fiscal year is at least $3.2 billion. The FAA utilizes the official enplanement totals from the Air Carrier Activity Information System (ACAIS) database, which is two years behind the current date for determination of entitlement funds.

In addition, airports that have over 100 million pounds of landed weight by all-cargo carriers, receive an air cargo entitlement. The air cargo entitlement fund is established at three percent of the annual AIP appropriation. The Sunport air cargo forecast does not indicate that it will exceed the threshold for landed weight during the 20-year term of this Master Plan. Therefore, the Sunport is not likely to be eligible for air cargo entitlements.

Small Airport Fund

If a large or medium hub commercial service airport chooses to institute a passenger facility charge (PFC), discussed in more detail below, which is a fee of up to $4.50 on each airline ticket, for funding of capital improvement projects, then their entitlement is reduced. A portion of those entitlements go to the small airport fund. The small airport fund is reserved for small-hub primary commercial service airports, non-hub commercial service airports, and general aviation airports. As a medium hub commercial service airport, the Sunport is not eligible for funds from this source.

Discretionary Funds

Airports may often face major projects that will require funds in excess of the airports' annual entitlements. Thus, additional funds from discretionary apportionments under AIP become desirable. The primary feature about discretionary funds is that they are distributed on a priority basis. The priorities are established by the FAA, utilizing a priority code system. Under this system, projects are ranked by their purpose. Projects ensuring airport safety and security are ranked as the most important priorities, followed by maintaining current infrastructure development, mitigating noise and other environmental impacts, meeting standards, and increasing system capacity.

It is important to note that competition for discretionary funding is not limited to airports in the State of New Mexico or those within the FAA Southwest Region. The funds are distributed to all airports in the

country, thus are more difficult to obtain. High priority projects will often fare favorably, while lower priority projects may not receive discretionary grants.

Set-Aside Funds

Portions of AIP funds are set-asides designed to achieve specific funding minimums for noise compatibility planning and implementation, select former military airfields (Military Airports Program), and select reliever airports. It is not anticipated that the Sunport will be eligible for this funding category.

FAA Facilities and Equipment (F&E) Program

The Airway Facilities Division of the FAA administers the Facilities and Equipment (F&E) Program. This program provides funding for the installation and maintenance of various navigational aids and equipment of the national airspace system. Under the F&E program, funding is provided for FAA Airport Traffic Control Towers (ATCTs), enroute navigational aids, on-airport navigational aids, and approach lighting systems.

Facilities at the Sunport that are eligible to receive funding from the F&E program include the ATCT and navaids, including the instrument landing system.

PASSENGER FACILITY CHARGE (PFC)

The *Aviation Safety and Capacity Expansion Act of 1990* contained a provision for airports to levy a passenger facility charge (PFC), which is a user fee, for the purposes of preserving, enhancing, or making a significant contribution to airport safety, capacity, security, or to reduce or mitigate noise impacts, improve local air quality, enhance competition, or reduce current or anticipated congestion. PFC revenue may be used on a "pay-as-you-go" basis or leveraged to pay debt service on bonds or other debt used to pay for PFC-eligible projects.

14 CFR, Part 158, of May 29, 1991, establishes the regulations that must be followed by airports choosing to levy PFCs. Passenger facility charges may be imposed by public agencies controlling a commercial service airport with at least 2,500 annual passengers with scheduled service. Authorized agencies were initially allowed to impose a charge of $1.00, $2.00, or $3.00 per enplaned passenger. Legislation (*AIR-21*) passed in 2000 allowed the cap to increase to $4.50, which remains the current cap level. Prior approval is required from the Department of Transportation (DOT) before an airport may levy a PFC. The DOT must find that the projected revenues are needed for specific, approved projects. Although FAA is required to approve the collection and use of PFCs, the program permits local collection of PFC revenue through the airlines operating at an airport and provides more flexibility to airport sponsors than AIP funds.

PFC revenue may be used on a "pay-as-you-go" basis or leveraged to pay debt service on bonds or other debt used to pay for PFC-eligible projects.

Any AIP-eligible project, whether development or planning related, is eligible for PFC funding. Gates and related areas for the movement of passengers and baggage are eligible, as are on-airport ground access projects. Any project approved must preserve or enhance safety, security, or capacity; reduce/mitigate noise impacts; or enhance competition among carriers.

PFCs may be used only on approved projects. However, PFCs can be utilized to fund 100 percent of a project. They may also be used as matching funds for AIP grants or to augment AIP-funded projects. PFCs can be used for debt service and financing costs of bonds for eligible airport development. These funds may also be commingled with general revenue for bond debt service. Before submitting a PFC application, an airport must give notice and an opportunity for consultation with airlines operating at an airport.

PFCs are treated more like other airport improvement grants, rather than as airport revenues, and they are administered by the FAA. Airlines retain up to 11 cents per passenger for collecting the PFCs. It should also be noted that only revenue passengers pay PFCs. Non-revenue passengers, such as those using frequent flier rewards or airline personnel, are counted as enplanements but do not generate PFCs. The Sunport has imposed a $4.50 PFC to fund projects.

STATE FUNDING PROGRAMS

The New Mexico Department of Transportation – Aviation Division recognizes that airports make a valuable contribution to the state's transportation economy. Therefore, NMDOT administers a grant program to fund airport planning, construction, and maintenance projects. Funding for state aviation grant programs is sourced from taxes on jet fuel, aircraft registration fees, and apportionment by the state legislature from the general fund. The revenue generated from these taxes and fees are deposited into a restricted aviation account. On an annual basis, approximately $3 million is available for state grants.

New Mexico Aviation Grant Program

The Aviation Division administers the aviation grant program. Grants are typically awarded either in support of a federal grant or as a state grant. The state will pay for 50 percent of the local match on federal grants. State grants are administered as a 50/50 cost share with the local airport sponsor. Projects eligible for the state grant program include all AIP-eligible projects, as well as many projects not typically eligible for AIP grants. For example, the state can participate in revenue-generating projects, such as fuel farms and hangars. Project participation is determined by the management of the Aviation Division.

New Mexico Air Service Assistance Program

The final grant program available to state airports is the Air Service Assistance Program. This grant program is specifically established by the state legislature and is codified in New Mexico Code, Title 18,

Chapter 11, Part 3. Under this program, two or more communities can submit a grant application for funds of up to $200,000 with a 50 percent match. The grant funds are restricted to marketing, promotion, and certain equipment, and cannot be used as a direct subsidy to an airline.

LOCAL FUNDING

The balance of project costs, after consideration has been given to grants, must be funded through local resources. A goal for any airport is to generate enough revenue to cover all operating and capital expenditures, if possible.

There are several local financing options to consider when funding future development at airports, including airport revenues, issuance of a variety of bond types, and leasehold financing. These strategies could be used to fund the local matching share, or the entire project if grant funding is not forthcoming. Below is a brief description of the most common local funding options:

Bonding: Bonding is a common method to finance large capital projects at airports. A bond is an instrument of indebtedness of the bond issuer to the bond holders, thus a bond is a form of loan or IOU. While bond terms are negotiable, typically the bond issuer is obligated to pay the bond holder interest at regular intervals and repay the principal by the maturity date.

Leasehold Financing: Leasehold financing refers to a developer or tenant financing improvements under a long-term ground lease. The advantage of this arrangement is that is relieves the airport from the responsibility of raising capital funds for the improvement. As an example, an FBO might consider constructing hangars and charging fair market lease rates, while paying the airport for a ground lease. A fuel farm can be undertaken in the same manner with the developer of the facility paying the airport a fuel flowage fee.

Customer Facility Charge (CFC): A CFC is the imposition of an additional fee charged to customers for the use of certain facilities. The most common example is when an airport constructs a consolidated rental car facility and imposes a fee for each rental car contract. That fee is then used by the airport to pay down the debt incurred from building the facility. The Sunport currently collects a CFC for the construction of the rental car facility.

The Sunport currently collects a CFC for the construction of the rental car facility.

SUNPORT DEVELOPMENT SCHEDULES AND COST SUMMARIES

Now that the specific needs and improvements for the Sunport have been established, the next step is to determine a realistic schedule and the associated costs for implementing the recommended development concept. The implementation plan considers the interrelationships among the projects to determine an appropriate sequence of projects while remaining within reasonable fiscal constraints. Following FAA guidance for Master Plans, the list of projects considered are those that are eligible for FAA grant

funding. It should be understood the Sunport has numerous non-eligible capital projects which are not specifically identified and discussed in the Master Plan.

This section will examine the overall cost of each item in the recommended development alternative and present a master development schedule. A CIP, programmed by years, has been developed to cover the first five years of the plan. The remaining projects are grouped into intermediate (years 6-10) and long (years 11-20) term planning horizons. More detailed information is provided for the five-year horizon, with less detail provided for the longer planning periods. By utilizing planning horizons instead of specific years for intermediate and long-term development, the Sunport will have greater flexibility to adjust capital needs as demand dictates. **Table 7B** summarizes the key milestones for each of the three planning horizons.

TABLE 7B
Planning Horizon Activity Levels
Albuquerque International Sunport

	BASE YEAR 2014	PLANNING HORIZONS		
		Short-Term	Intermediate-Term	Long-Term
Enplaned Passengers	**2,446,388**	**2,490,000**	**2,750,000**	**3,330,000**
Commercial Operations				
Air Carrier	57,172	56,600	61,000	70,000
Air Cargo	10,202	10,500	10,900	11,600
Other Air Taxi	12,304	13,200	13,900	15,800
Total Commercial Operations	79,678	80,300	85,800	97,400
General Aviation Operations				
Itinerant	28,548	29,300	31,600	36,200
Local	2,930	3,100	3,200	3,500
Total General Aviation Operations	31,478	32,400	34,800	39,700
Military Operations				
Itinerant	16,683	16,100	16,100	16,100
Local	2,230	2,800	2,800	2,800
Total Military Operations	18,913	18,900	18,900	18,900
Total Sunport Operations	**130,069**	**131,600**	**139,500**	**156,000**
Based Aircraft	**165**	**170**	**190**	**220**

Source: FAA approved forecasts (11.18.2015)

A key aspect of this planning document is the use of demand-based planning milestones. The short-term planning horizon contains items of highest need and/or priority. As short-term horizon activity levels are reached, it will then be time to program for the intermediate-term based upon the next activity milestones. Similarly, when the intermediate-term milestones are reached, it will be time to program for the long-term activity milestones.

Several development items included in the recommended concept will need to follow demand indicators which essentially establish triggers for key improvements. For example, the recommended concept includes construction of an addition to Concourse B. Growth in enplanements is the trigger for this project. If growth slows or does not occur as projected, the terminal addition can be delayed. As a result, capital expenditures will be undertaken as needed, which leads to a responsible use of capital assets. Some development items do not depend on demand, such as pavement maintenance. These types of projects typically are associated with day-to-day operations and should be monitored and identified by Sunport management.

Not all potential projects considered in the recommended concept will need to follow specific demand milestones. Many projects are necessary to maintain existing facilities and to meet FAA design standards for safety. These projects need to be programmed in a timely manner regardless of changes in demand indicators.

As a master plan is a conceptual document, implementation of the capital projects should only be undertaken after further refinement of their design and costs through architectural and engineering analyses. Moreover, some projects may require additional infrastructure improvements (i.e., drainage improvements, extension of utilities, etc.) that may take more than one year to complete. Some projects may also require agency coordination activities, as well as public coordination activities that carry the public involvement process into the project implementation phase. As with all projects undertaken with federal funds, appropriate environmental documentation will need to be developed prior to implementation.

Many projects are necessary to maintain existing facilities and to meet FAA design standards for safety.

Capital costs presented here should be viewed only as estimates subject to further refinement during design.

At this juncture, it is difficult to know, precisely, what the cost of individual projects will be. Many federal agencies utilize a five-class cost estimating system, as presented in **Table 7C**. For master planning projects, order-of-magnitude estimates are appropriate and are considered sufficiently accurate for planning purposes. The cost estimates are in 2017 dollars and should be increased accordingly for the actual year of implementation.

TABLE 7C
Cost Estimate Classification

Estimate Class	Name	Purpose	Project Definition Level
Class 5	Order-of-Magnitude	Screening or Feasibility	0% to 2%
Class 4	Intermediate	Concept Study or Feasibility	1% to 15%
Class 3	Preliminary	Budget, Authorization, or Control	10% to 40%
Class 2	Substantive	Control or Bid/Tender	30% to 70%
Class 1	Definitive	Check Estimate or Bid/Tender	50% to 100%

Source: U.S. Department of Energy

Exhibit 7A presents the proposed CIP for the Sunport. The first funding column presents an estimate of the total cost of the project. The second funding column presents that portion of the project cost that is eligible for FAA funding through the AIP. The third funding column considers the Sunport's matching share responsibility. The matching share is eligible for funding through Passenger Facility Charges (PFCs) that the Sunport can impose on airline tickets or through other local revenue sources.

Under most circumstances, a medium hub commercial service airport, such as the Sunport, the AIP eligible share is 75 percent. Certain states with a high percent of federal or tribal lands (public land states) may receive a higher federal share. New Mexico qualifies for the higher federal share because 26.44 percent of the land is considered federal or tribal. This results in a maximum funding level through AIP of 84.29 percent for the Sunport.

Exhibit 7B graphically presents the master plan projects on an aerial photograph of the Sunport. The projects are color-coded by planning horizon to indicate the recommended phasing of each project. The CIP establishes a list of projects recommended over the next 20-years. The key activities and responsibilities for implementation will vary from project to project, but will include project funding activities, environmental processing activities, sponsor-specific project implementation process activities associated with designing and constructing projects, agency coordination, and public involvement coordination.

SHORT-TERM IMPROVEMENTS

The short-term projects are those anticipated to be needed in years one through five of the 20-year CIP. The list of projects is further divided into yearly timeframes and are prioritized based on the needs of the Sunport. Projects related to safety and preservation generally have the highest priority. The following sub-sections discuss each of the projects in the short-term CIP.

- Runway 8 and 12 Decoupling: As shown on **Exhibit 7C**, remove the lead-in taxiway leading to the Runway 12 threshold to immediately remedy the priority Hot Spot #1. Remove Taxiway E1 (south of Taxiway E) and Taxiway K from airfield movement area for which the tower is responsible. Relocate the Taxiway E1 hold line outside the threshold siting surface.
- Runway 8-26 Rehabilitation: Repave and replace various pavement sections.
- Relocate Taxiway A1 Holdline: Relocate the holdline from threshold siting surface by moving it onto Taxiway A between Taxiways A2 and A3.
- Install Terminal Apron "Island" at Taxiway A3: Utilizing painted markings and relocated signage, create an apron "island" to prevent direct access from the terminal apron to the runway. Consideration may be given to a Memorandum of Agreement (MOA) between the tower and the airport to not allow aircraft to proceed from the apron, across Taxiway A, and south onto Taxiway A3.
- Taxiway C Fillet Reduction: Narrow Taxiway C to address "Hot Spot #3" by reducing this wide expanse of pavement. It should be noted that while there have been no pilot issues at this hot

		Project Description	Project Cost	AIP Eligible (84.29%)	Local Share
SHORT TERM PROGRAM (0-5 YEARS)					
1	2018	RW 8 and 12 Decoupling (RIM/HS No.1 Mitigation)[1]	$361,000	$304,287	$56,713
2	2018	RW 8-26 Pavement Rehab	$3,818,000	$3,218,192	$599,808
3	2019	TW A1 Holdline Relocation	$167,000	$140,764	$26,236
4	2019	South Terminal Apron Island @ A3	$122,000	$102,834	$19,166
5	2019	TW C Fillet Reduction (HS No.3 Mitigation)	$300,000	$252,870	$47,130
6	2019	TW F7 New (RW 21 Exit TW)	$1,476,000	$1,244,120	$231,880
7	2020	TW E Reconstruction - Design	$600,000	$505,740	$94,260
8	2020	TW F3 Closure (Taxilane to Cargo Apron)	$153,000	$128,964	$24,036
9	2020	EA for Runway 8 Landing Threshold Shift (not pictured)	$1,000,000	$842,900	$157,100
10	2021	TW E Reconstruction - Construct Ph I[2]	$6,982,000	$5,885,128	$1,096,872
11	2021	ARFF Equipment and Building	$3,035,000	$2,558,202	$476,799
12	2021	Runways 8 & 12 Landing Threshold Reconfiguration - Design	$1,239,000	$1,044,353	$194,647
13	2022	TW E Reconstruction (Ph2) - Construct	$6,500,000	$5,478,850	$1,021,150
14	2022	West Terminal Ramp Reconstruction/Fuel Truck Parking	$4,902,000	$4,131,896	$770,104
15	2022	Terminal Building Perimeter Concrete Reconstruction	$2,816,000	$2,373,606	$442,394
16	2022	Acquire Property Easement (1.8 Acres)	$280,000	$236,012	$43,988
17	2022	Runways 8 & 12 Landing Threshold Reconfiguration - Construct	$9,090,000	$7,661,961	$1,428,039
18	2022	TW E Reconstruction (Ph3) - Construct	$4,980,000	$4,197,642	$782,358
19	2022	East (RON) Apron - Construct	$10,806,000	$9,108,377	$1,697,623
20		On-Going Pavement Maintenance (Short Term)	$500,000	$421,450	$78,550
TOTAL			**$59,127,000**	**$49,838,148**	**$9,288,852**
INTERMEDIATE TERM PROGRAM (Years 6-10)					
1		TW B Reconstruction	$10,763,000	$9,072,133	$1,690,867
2		GA Heavy Apron (South)/TW F1 Relocation - Construct	$2,508,000	$2,113,993	$394,007
3		TW A2 Closure	$449,000	$378,462	$70,538
4		TW E4, E7, E9, E11 Closure[3]	$2,109,000	$1,777,676	$331,324
5		TW G1 Relocation (HS No.2 Mitigation)	$952,000	$802,441	$149,559
6		TW J Closure[3]	$568,000	$478,767	$89,233
7		Expand Air Cargo Apron - Construct	$5,950,000	$5,015,255	$934,745
8		GA Heavy Apron North (In Triangle) - Construct	$2,242,000	$1,889,782	$352,218
9		TW D Rehabilitation	$503,000	$423,979	$79,021
10		Cargo Apron Slab Rehab	$693,000	$584,130	$108,870
11		Elevator Concourse B - Construct	$280,000	$236,012	$43,988
12		On-Going Pavement Maintenance (Intermediate Term)	$500,000	$421,450	$78,550
TOTAL			**$27,517,000**	**$23,194,079**	**$4,322,921**
LONG TERM PROGRAM (Years 11-20)					
1		TW A4, A6, A7 Closure/Construct Replacement TW[3]	$3,951,000	$3,330,298	$620,702
2		Threshold Taxiway to Runway 12 - Construct	$5,000,000	$4,214,500	$785,500
3		Remove Belly Freight Building	$1,050,000	$885,045	$164,955
4		West Terminal Taxilane - Construct	$2,539,000	$2,140,123	$398,877
5		Concourse B Extension - Construct	$7,300,000	$6,153,170	$1,146,830
6		FIS/International Terminal - Construct	$4,600,000	$3,877,340	$722,660
7		Concessions In-Fill - Construct	$5,600,000	$0	$5,600,000
8		Split Automated Baggage Screening and Delivery	$5,200,000	$4,383,080	$816,920
9		TW F Rehabilitation	$368,000	$310,187	$57,813
10		TW G Rehabilitation	$154,000	$129,807	$24,193
11		RW 3-21 Rehabilitation	$708,000	$596,773	$111,227
12		RW 12-30 Rehabilitation	$1,535,000	$1,293,852	$241,149
13		On-Going Pavement Maintenance (Long Term)	$1,000,000	$842,900	$157,100
TOTAL			**$39,005,000**	**$28,157,075**	**$10,847,925**
TOTAL			**$125,649,000**	**$101,189,302**	**$24,459,697**

[1]Project includes removing Twy E1 south of Twy E and Twy K from the aircraft movement area under tower control.
[2]Includes removal of TW E5
[3]Cost includes pavement removal; however closure/removal should occur when pavement at end of useful life.

spot, issues with vehicles have been documented. They may be further resolved through additional driver training.

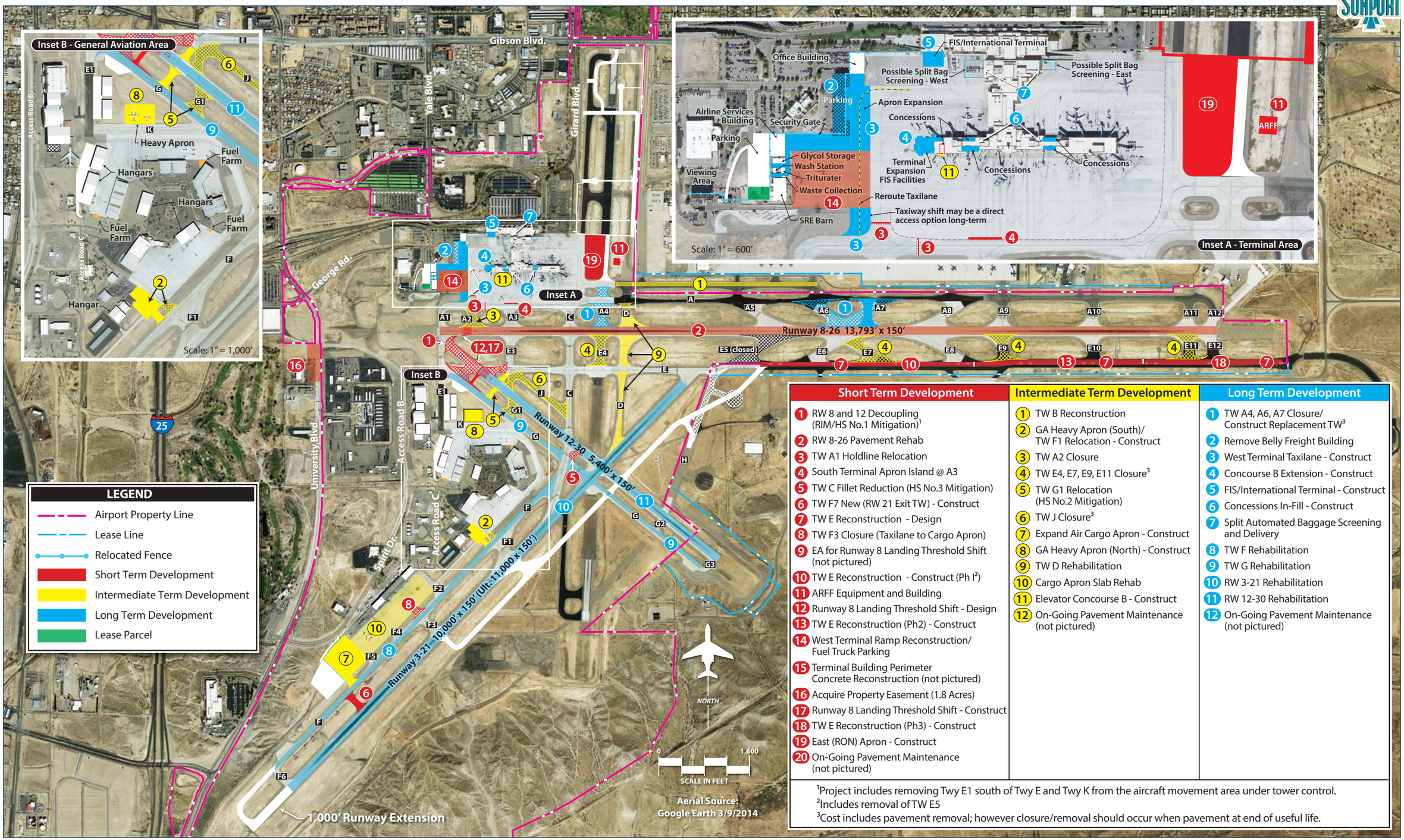
- Construct new Taxiway F7: New Runway 21 exit for capacity and efficiency improvement.
- Reconstruction of East Portion of Taxiway E: Three-phase project to reconstruct that portion of Taxiway E between Taxiway E5 and the east airport property line. Project cost includes removal of Taxiway E5.
- Taxiway F3 Removal: Remove Taxiway F3 between the air cargo apron and Taxiway F to eliminate direct access from the apron to the runway.
- Construct ARFF Building: Identify a location, east of the terminal area for a City-owned ARFF building. This is only to be constructed if the City were to take over primary emergency response from Kirtland Air Force Base.
- West Terminal Apron Reconstruction: Reconstruction of deteriorating pavement area to include strengthening and space for fuel truck parking.
- Terminal Building Perimeter Concrete Reconstruction: Multiple pavement sections immediately adjacent to the terminal building and concourses are deteriorating.
- Runway 8 Landing Threshold Relocation: The permanent remedy to prevent holding aircraft from penetrating the approach surface to Runway 8 is relocating the displaced landing threshold west 600 feet. The Runway 12 threshold will need to be relocated 600 feet southeast to accommodate the relocated ILS critical area for Runway 8. Property west of University Boulevard that will be inside the RPZ, but not already owned by the Sunport, will need to be controlled by easement or acquisition. This project could ultimately require relocating a portion of University Boulevard out of the RPZ if determined necessary by the FAA.
- East RON Apron: Expand the east side of the terminal apron to accommodate aircraft that remain-overnight (RON). Apron will also provide adequate taxi separation for larger aircraft that may need to access gates on the north side of Concourse A.

Short-term improvements presented on **Exhibit 7A** and depicted on **Exhibit 7B** are estimated at $59.1 million. Of this total, approximately $49.8 million is eligible for FAA AIP development grants. The Sunport matching share is $9.3 million which is eligible for PFC funding. All projects in the short-term planning period are eligible for AIP or PFC funding.

INTERMEDIATE-TERM IMPROVEMENTS

The intermediate-term projects are those that are anticipated to be necessary in years six through 10 of the Master Plan. These projects are not tied to specific years for implementation; instead, they have been prioritized so that Sunport management has the flexibility to determine when they need to be pursued based on current conditions. It is not unusual for certain projects to be delayed or advanced based on changing conditions, such as funding availability or changes in the aviation industry.

- Taxiway B Reconstruction: Taxiway B is showing signs of significant deterioration and reconstruction is anticipated to be needed in the intermediate-term.



Short Term Development

1. RW 8 and 12 Decoupling (RIM/HS No.1 Mitigation)[1]
2. RW 8-26 Pavement Rehab
3. TW A1 Holdline Relocation
4. South Terminal Apron Island @ A3
5. TW C Fillet Reduction (HS No.3 Mitigation)
6. TW F7 New (RW 21 Exit TW) - Construct
7. TW E Reconstruction - Design
8. TW F3 Closure (Taxilane to Cargo Apron)
9. EA for Runway 8 Landing Threshold Shift (not pictured)
10. TW E Reconstruction - Construct (Ph I[2])
11. ARFF Equipment and Building
12. Runway 8 Landing Threshold Shift - Design
13. TW E Reconstruction (Ph2) - Construct
14. West Terminal Ramp Reconstruction/ Fuel Truck Parking
15. Terminal Building Perimeter Concrete Reconstruction (not pictured)
16. Acquire Property Easement (1.8 Acres)
17. Runway 8 Landing Threshold Shift - Construct
18. TW E Reconstruction (Ph3) - Construct
19. East (RON) Apron - Construct
20. On-Going Pavement Maintenance (not pictured)

Intermediate Term Development

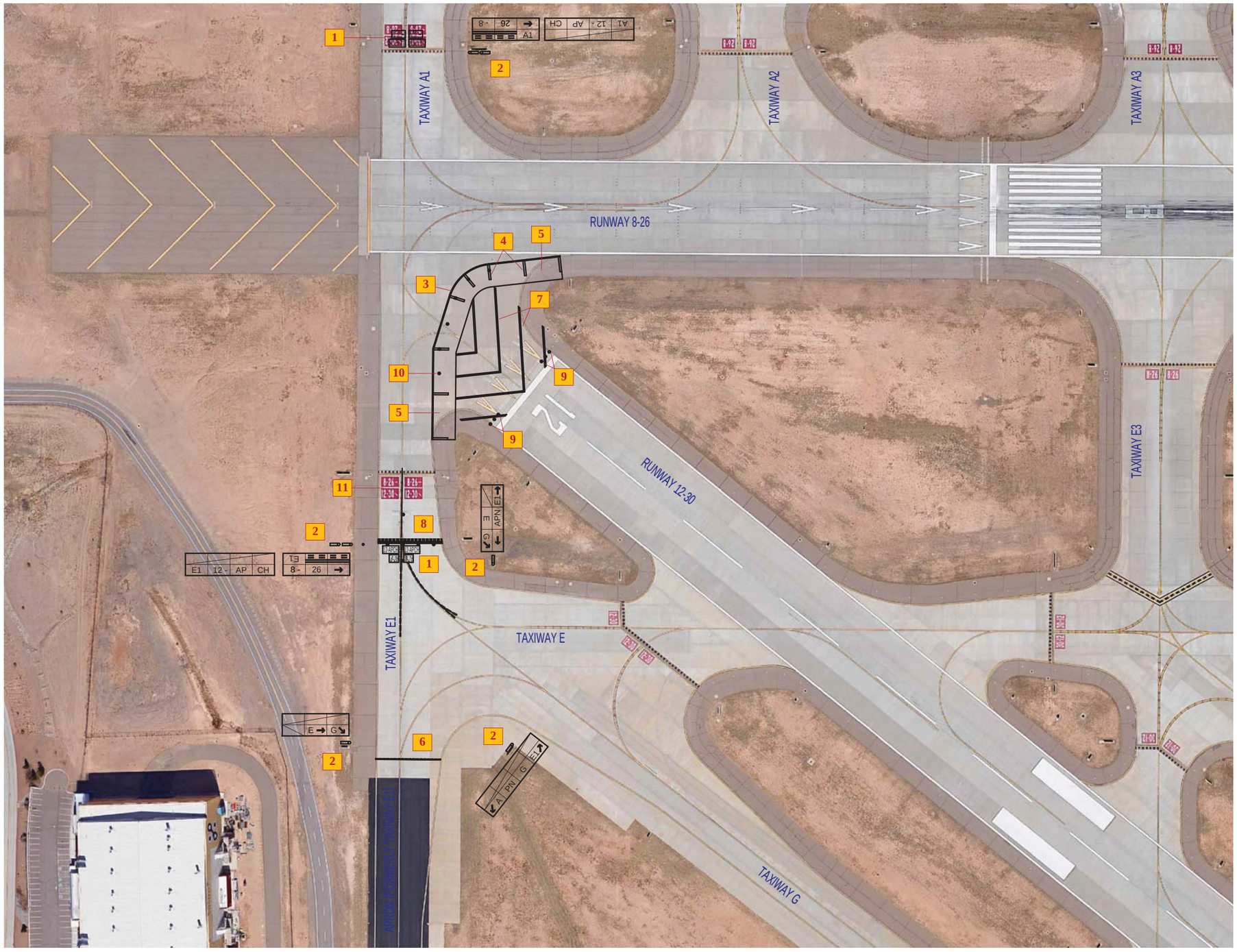
1. TW B Reconstruction
2. GA Heavy Apron (South)/ TW F1 Relocation - Construct
3. TW A2 Closure
4. TW E4, E7, E9, E11 Closure[3]
5. TW G1 Relocation (HS No.2 Mitigation)
6. TW J Closure[3]
7. Expand Air Cargo Apron - Construct
8. GA Heavy Apron (North) - Construct
9. TW D Rehabilitation
10. Cargo Apron Slab Rehab
11. Elevator Concourse B - Construct
12. On-Going Pavement Maintenance (not pictured)

Long Term Development

1. TW A4, A6, A7 Closure/ Construct Replacement TW[3]
2. Remove Belly Freight Building
3. West Terminal Taxilane - Construct
4. Concourse B Extension - Construct
5. FIS/International Terminal - Construct
6. Concessions In-Fill - Construct
7. Split Automated Baggage Screening and Delivery
8. TW F Rehabilitation
9. TW G Rehabilitation
10. RW 3-21 Rehabilitation
11. RW 12-30 Rehabilitation
12. On-Going Pavement Maintenance (not pictured)

[1]Project includes removing Twy E1 south of Twy E and Twy K from the aircraft movement area under tower control.
[2]Includes removal of TW E5
[3]Cost includes pavement removal; however closure/removal should occur when pavement at end of useful life.

This page intentionally left blank



Keyed Notes

1. REMOVE , REPAINT EXISTING SURFACE PAINTED HOLDING POSITION SIGN
2. NEW / REVISED AIRFIELD GUIDANCE SIGNAGE
3. NEW DUAL CONTINUOUS TAXIWAY EDGE MARKING (AVIATION YELLOW)
4. NEW 3' x 25' WIDE TAXIWAY SHOULDER STRIPES (AVIATION YELLOW) AT 50' MAXIMUM SEPARATION
5. PAINT 35' WIDE SHOULDER WITH NEW AVIATION GRADE ARTIFICIAL TURF MARKING (AVIATION GREEN), EXISTING SHOULDERS TO REMAIN UNDISTURBED
6. NEW NON-MOVEMENT AREA BOUNDARY LINE (AVIATION YELLOW)
7. NEW RUNWAY 12-30 BLAST PAD MARKINGS (AVIATION YELLOW)
8. NEW RUNWAY HOLDING POSITION MARKING WITH INSET GUARD LIGHTS
9. NEW RUNWAY THRESHOLD/END LIGHTS
10. NEW ELEVATED TAXIWAY EDGE LIGHTS
11. REMOVE EXISTING HOLDING POSITION LINE WITH MARKINGS AND LIGHTING

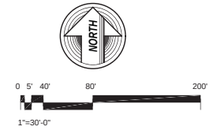


Exhibit 7C
SHORT TERM RUNWAY 8 AND 12 DECOUPLING

This page intentionally left blank

- Heavy Apron (South) Construction: The first of two heavy aircraft aprons to serve the large private and charter aircraft that utilize general aviation services. This project also includes relocation of Taxiway F1 between the south general aviation apron and Taxiway F to eliminate the existing direct access to the runway from the apron.
- Taxiway A2 Closure: Close Taxiway A2 to eliminate the existing direct access from the terminal apron to the runway. This taxiway may be reopened in the future when the west terminal apron taxilane is relocated/shifted to the west.
- Taxiways E4, E7, E9, E11 Closure: Plan to close these taxiways as they may be considered redundant. This will save maintenance and repair costs over the long-term. Ultimately, they may need to be removed altogether due to build-up of FOD (Foreign Object Debris). Closure should be scheduled at the end of their useful life.
- Taxiway G1 Relocation: This project will remedy Hot Spot #2 by closing existing Taxiway G1, which provides direct access to the runway from the general aviation apron, while reconstructing it slightly to the east.
- Taxiway J Closure: Lightly utilized Taxiway J is considered for closure at the end of its useful life to save on maintenance and repair costs.
- Air Cargo Apron Expansion: Air cargo apron is planned for expansion to the southwest to accommodate growing demand. Grading of the open/vacant space adjacent is planned to accommodate cargo truck parking and staging.
- Heavy Apron (North) Construction: The second heavy apron to accommodate large transport type aircraft utilizing general aviation services is planned to be located within the triangle area. Note that until this is constructed, Taxiway K can still be used for heavy aircraft.
- Taxiway D Rehabilitation: Taxiway D is planned to be rehabilitated.
- Air Cargo Slab Rehabilitation: Portions of the existing air cargo apron will likely require rehabilitation in the intermediate planning horizon.
- Concourse B Elevator: Construct an elevator to facilitate movement of Sunport and airline employees and equipment between levels.

Intermediate-term improvements presented on **Exhibit 7A** and depicted on **Exhibit 7B** are estimated at $27.5 million. Of this total, approximately $23.2 million is eligible for FAA AIP development grants. The Sunport matching share is $4.3 million which is eligible for PFC funding. All projects in the intermediate-term planning period are eligible for AIP or PFC funding.

LONG-TERM IMPROVEMENTS

Long-term projects are those considered for years 11-20 of the Master Plan.

- Taxiways A4, A6, and A7 Closure: Analysis indicated that several taxiways could be removed from service without substantially impacting airfield efficiency to reduce long-term maintenance costs. This project would close Taxiways A4, A6, and A7 and replace them with a single taxiway exit between A6 and A7. The new taxiway exit would be constructed at the traditional 90-degree angle.

- Construct Runway 12 Threshold Taxiway: If the initial solution to the Hot Spot in this area is not adequate, then a new threshold taxiway is planned.
- Remove Belly Freight Building: This building is aged and not utilized for its original purpose. To make space available for an expanded terminal apron, the Concourse B addition, a dedicated international terminal, and a relocated access taxilane, the belly freight building is planned to be removed.
- Relocate West Terminal Apron Taxilane: This project serves multiple purposes, including eliminating direct access from the apron to the runway and providing the additional separation needed to extend Concourse B.
- Concourse B Addition: If enplanements grow as forecast, there may be a need for two additional gates. To accommodate this need, an addition is planned at the end of Concourse B.
- Construct Federal Inspection Services/International Terminal: This project would construct a new building to serve international passengers.
- Concessions In-fill: Terminal building calculations show a need for additional concessions space. Several areas have been identified for this purpose. This is a revenue-producing project and is, therefore, not eligible for FAA funding.
- Automated Bag Screening/Delivery: While not considered necessary currently, there may be a desire to install an automated bag screening system in the future.
- Taxiway F Rehabilitation: By the long-term, Taxiway F is planned for major rehabilitation.
- Taxiway G Rehabilitation: By the long-term, Taxiway G is planned for major rehabilitation.
- Runway 3-21 Rehabilitation: In the long-term, Runway 3-21 will need to be reconstructed. At that time, it should be evaluated for necessary width. Under current design standards, it only needs to be 100 feet wide.
- Runway 12-30 Rehabilitation: In the long-term, Runway 12-30 will need additional rehabilitation.

Long-term improvements are estimated at $39.0 million. Of this total, approximately $28.2 million is eligible for FAA AIP development grants. The Sunport's matching share is $10.8 million, which is eligible for PFC funding.

CAPITAL IMPROVEMENT SUMMARY

A 20-year CIP has been prepared for the Sunport. In the short-term, several major projects have been identified, including those intended to remedy the Hot Spots on the airfield. The east portion of Taxiway E is planned to be reconstructed. A new taxiway exit (F7) is planned to provide greater efficiency for Runway 3-21. The terminal apron is planned to be expanded to the east to provide access to the north side of Concourse A for larger aircraft and to accommodate aircraft that remain overnight. The landing threshold to Runway 8 is planned to be shifted 600 feet to the west to eliminate the potential for holding aircraft to penetrate the Runway 8 approach surface.

The intermediate-term projects include closure of several redundant taxiways. These are planned to be closed at the end of their useful life. Two general aviation aprons designed to accommodate heavy charter aircraft are planned. Taxiway B is planned to be reconstructed. Taxiway G1 is planned to be

relocated to mitigate Hot Spot #2 (which currently allows direct access from the general aviation apron to Runway 12-30). Several other taxiway rehabilitation and reconstruction projects are planned in the intermediate planning horizon.

In the long-term, additional taxiway closures are planned when the pavement is at the end of its useful life. As demand dictates, an addition is planned to Concourse B, which would add two gates. This terminal expansion will require the access taxilane to be shifted to the west. To accommodate this shift, the existing belly freight building is planned to be removed. Major rehabilitation of Taxiways F and G and Runways 3-21 and 12-30 are also planned in the long-term. When Runway 12-30 is reconstructed, additional analysis will need to be undertaken to determine if the width should be maintained at 150 feet or if it should be narrowed to 100 feet.

The list of projects needed to accomplish the vision for the Sunport has been prioritized and cost estimates have been developed. Projects considered for the short-term planning horizon (years 1-5) have been divided into yearly increments. Projects considered for the intermediate (years 6-10) and long-term (years 11-20) have been prioritized and grouped together. The grouping of projects is necessary to provide the needed flexibility for the Sunport to adjust as necessary. In addition, on an annual basis, the Sunport and the FAA assemble and review a five-year CIP. Therefore, the list of projects and the prioritization of the projects can and likely will change in the future.

The total 20-year CIP is estimated to cost $125.7 million. Of this total, approximately $101.2 million is eligible for FAA AIP development grants. The Sunport's matching share is $24.5 million, which is eligible for PFC funding. Approximately $5.6 million is not eligible for AIP or PFC funding.

FUNDING PLAN

The primary funding sources for capital improvement projects included in this Master Plan will be through the AIP and the PFC programs. For medium hub (such as the Sunport) and large hub airports that collect a PFC of greater than $3.00, AIP funds apportioned must be reduced by an amount equal to the lesser of 75 percent of the projected revenues from the PFC or 75 percent of the passenger entitlement otherwise due the airport. The Sunport has elected to reduce their passenger apportionment as the PFC generates more revenue for airport development. **Table 7D** presents an approximation of the development funds available for use in airport development projects based on forecast enplanement levels.

As can be seen, the Sunport takes in approximately $10.3 million in PFC revenue and an additional $1.3 million in passenger entitlements. As enplanements increase, the revenue will also increase. Over the course of the next 20 years, the Sunport is anticipated to have more than $287 million available for capital development projects. The total CIP included in this Master Plan amounts to approximately $125 million. Therefore, the available funding appears to be adequate to accomplish the capital projects identified.

TABLE 7D
Projected Annual AIP Entitlement Funding
Albuquerque International Sunport

Period		Passenger Enplanements	25% of Passenger Entitlement Funds[4]	PFC Funds Less Collection Cost[3]	Total Entitlement and PFC Funds
CY	for FY				
2015	2017	2,323,883[1]	$1,338,471	$10,201,627	$11,540,098
2016	2018	2,341,719[1]	$1,342,930	$10,537,736	$11,880,666
2017	2019	2,468,095	$1,374,524	$10,834,937	$12,209,461
2018	2020	2,475,373	$1,376,343	$10,866,887	$12,243,231
2019	2021	2,482,673	$1,378,168	$10,898,934	$12,277,103
Short-Term Total (FY 2017-2021)			**$6,810,436**	**$53,340,121**	**$60,150,557**
2020	2022	2,490,000	$1,380,000	$10,931,100	$12,311,100
2021	2023	2,539,954	$1,392,489	$11,150,398	$12,542,887
2022	2024	2,590,911	$1,405,228	$11,374,099	$12,779,327
2023	2025	2,642,890	$1,418,223	$11,602,287	$13,020,510
2024	2026	2,695,911	$1,431,478	$11,835,049	$13,266,527
Intermediate-Term Total			**$7,027,417**	**$56,892,934**	**$63,920,350**
2025	2027	2,750,000	$1,445,000	$12,072,500	$13,517,500
2026	2028	2,803,133	$1,458,283	$12,305,754	$13,764,037
2027	2029	2,857,292	$1,471,823	$12,543,512	$14,015,335
2028	2030	2,912,498	$1,485,625	$12,785,866	$14,271,491
2029	2031	2,968,770	$1,499,693	$13,032,900	$14,532,593
2030	2032	3,026,130	$1,514,033	$13,284,711	$14,798,743
2031	2033	3,084,598	$1,528,650	$13,541,385	$15,070,035
2032	2034	3,144,195	$1,543,549	$13,803,016	$15,346,565
2033	2035	3,204,944	$1,558,736	$14,069,704	$15,628,440
2034	2036	3,266,867	$1,574,217	$14,341,546	$15,915,763
2035	2037	3,330,000	$1,590,000	$14,618,700	$16,208,700
Long-Term Total			**$16,669,607**	**$146,399,595**	**$163,069,201**
TOTAL			**$30,507,460**	**$256,632,650**	**$287,140,108**

[1]Actual
[2]Preliminary estimate
[3]Assumed to be $0.11 per enplanement
[4]By regulation, when a medium hub airport implements PFCs of greater than $3.00, the passenger entitlement or the PFC total is reduced by 75%, whichever is lower.
CY - Calendar Year; FY - Fiscal Year

SUMMARY

The best means to begin implementation of the recommendations in the Master Plan is to first recognize that planning is a continuous process that does not end with completion and approval of this document. Rather, the ability to continuously monitor the existing and forecast status of Sunport activity must be provided and maintained. The issues upon which the Master Plan is based will remain valid for a number of years. The primary goal is for the Sunport to best serve the air transportation needs of the region, while continuing to be economically self-sufficient.

The actual need for many facilities is most appropriately established by actual activity levels rather than a specified date. For example, the air cargo apron is planned to be expanded; however, this project should only be pursued as demand increases. In reality, the timeframe in which the development is needed may be substantially different. Actual demand may be slower to develop than expected. On the other hand, high levels of demand may establish the need to accelerate the development. Although every effort has been made in this master planning process to conservatively estimate when facility development may be needed, actual aviation demand will dictate when facility improvements need to be delayed or accelerated.

In addition, numerous projects have been identified that will not depend upon increased demand. These include resolution to FAA-identified Hot Spots, taxiway geometry, and regular pavement maintenance.

The real value of a usable master plan is in keeping the issues and objectives in the minds of the managers and decision-makers so that they are better able to recognize change and its effect. In addition to adjustments in aviation demand, decisions made as to when to undertake the improvements recommended in the Master Plan will impact the period that the plan remains valid. The format used in this Master Plan is intended to reduce the need for formal and costly updates by simply adjusting the timing. Updating can be done by the manager, thereby improving the plan's effectiveness.

In summary, the planning process requires the Sunport management to consistently monitor the progress of the Sunport in terms of passenger enplanements, aircraft operations, based aircraft, and peaking characteristics. Analysis of aircraft demand is critical to the timing and need for certain Sunport facilities. The information obtained from continually monitoring Sunport activity will provide the data necessary to determine if the development schedule should be accelerated or decelerated.

SUSTAINABILITY IMPLEMENTATION PLAN

Previous sustainability elements in this Master Plan have outlined the Sunport's current sustainability performance, identified specific goals and objectives, and set performance targets. The following section provides a plan for implementation of the recommended sustainability objectives. To support the successful implementation of the sustainability plan, an evaluation of each objective's associated benefits, staffing needs, and costs has been undertaken. In addition, a method for the Aviation Department to track key performance indicators (KPIs) has been established to aid in the continual monitoring and refinement of the Sustainability Plan. Finally, numerous sources for sustainability project grants and loans potentially available to the Aviation Department are discussed, including federal, state, local, and private programs.

OBJECTIVE EVALUATION

An evaluation of the objectives outlined have been prepared using the Sustainable Aviation Guidance Alliance (SAGA) database of sustainable practices. SAGA is a coalition of aviation interests that formed in 2008 to assist airport operators in planning, implementing, and maintaining sustainability programs.

Membership of SAGA is made up of many aviation/airport industry organizations, including American Association of Airport Executives (AAAE), Airports Council International – North America (ACI-NA), Airport Consultants Council (ACC), the FAA, Airlines for America (A4A), and various airport consultants. The database utilized for this evaluation consists of over 900 sustainability practices, including evaluation criteria based upon their applicability to economic viability; operational efficiency; natural resource conservation; and social responsibility (EONS). The following seven criteria were utilized to evaluate each sustainability objective proposed in this master plan:

- Upfront capital investment to plan, design, and construct the project;
- Estimated annual operation and maintenance (O & M) costs;
- Payback period for a return on the initial capital investment;
- Staffing requirements in terms of hours required per month to implement or operate the practice;
- Energy reduction in terms of how the project will impact the amount of fossil fuels and/or building electricity consumed;
- Natural environmental benefits that result from the project; and
- How the project affects society and employee well-being.

The results of the objective evaluation are included on **Exhibit 7D**. The exhibit also differentiates between short and long-term objectives. Short-term objectives are those that should be implemented within five years to achieve the sustainability objective, including those that had the lowest initial capital costs and those that the Sunport is already in the process of pursuing. Sustainability objectives that are classified as long-term are those that should be planned for the future, approximately six to 20 years from the present.

SUSTAINABILITY MONITORING PROGRAM

Routine monitoring of the sustainability program by Aviation Department staff will be necessary to measure program performance. Understanding the positive and negative results of program implementation will allow Aviation Department staff to determine if the airport is progressing toward its overall sustainability goals or if adjustments need to be made to the program.

The Sustainability Report Card serves as a continuous monitoring device to summarize lessons learned, issues that arise, and opportunities for improvement.

To support the Aviation Department in this data collection and analysis process, a Sustainability Report Card has been created. The Report Card, included as **Exhibit 7E**, is designed to compare the reporting year status to the baseline of this master plan (2014) and to outline improvements from the previous year's data. The second page of the Report Card allows staff to report on any issues/challenges and lessons learned in its sustainability program. As a living document, the sustainability plan needs to be monitored on a regular basis. The Sustainability Report Card serves as a continuous monitoring device to summarize lessons learned, issues that arise, and opportunities for improvement. The Report Card can also serve as a means for promoting the Sunport's sustainability efforts and performance to the public.

SUSTAINABLE OBJECTIVE EVALUATION	INITIAL INVESTMENT	O & M COST[1]	PAYBACK PERIOD	STAFFING REQUIREMENTS	ENERGY REDUCTION	ENVIRONMENTAL BENEFITS	SOCIAL BENEFITS
SHORT-TERM OBJECTIVES							
1. Coordinate with the City's Purchasing Division to establish a Green Procurement Program.	$$	⚙⚙⚙⚙	$$	🕐🕐	N/B	🌍🌍	🌍
2. Incorporate high-efficiency HVAC systems.	$$	⚙⚙	$	🕐🕐	🌿	🌍🌍	N/B
3. Expand recycling marketing & promotion efforts within the terminal.	$$	⚙⚙⚙	$$$	🕐🕐	N/B	🌍🌍	🌍🌍
4. Engage tenants & airlines to ensure their involvement in the recycling program.	$$	⚙	N/A	🕐	N/B	🌍	🌍🌍
5. Collaborate with the City's Solid Waste Management Department on expanding the Sunport's recycling program.	$	N/A	N/A	🕐🕐	N/B	🌍	🌍
6. Conduct regular (annual/biennial) waste assessments to monitor solid waste & recycling rates.	$$$	⚙⚙	$$$	🕐🕐🕐	N/B	🌍🌍🌍	🌍🌍
7. Continue to transition to high-efficiency lighting.	$$$	⚙⚙	$	🕐🕐	🌿	🌍	N/B
8. Promote the reduction or elimination of idling automobiles in & around the Sunport.	$	⚙	$	🕐	🌿	🌍🌍	N/B
9. Expand water fixture replacement to all outdated fixtures.	$$$	⚙	$$	🕐	🌿	🌍🌍	N/B
10. Implement low-impact development & green infrastructure techniques to improve stormwater runoff quality & to reduce water use for landscaped areas.	$$	⚙⚙⚙⚙	$$	🕐🕐	N/B	🌍	🌍
11. Incentivize employee use of public transit & alternative fueled vehicles.	$	⚙	$	🕐	N/B	🌍	🌍
12. Use social media & other public outlets to promote the use of public transit or cycling to/from the Sunport.	$	⚙	$	🕐	N/B	N/B	🌍
13. Promote the Sunport as an expansion destination for the City's pilot bike share program (BICI).	$	⚙	$	🕐	🌿	🌍	🌍
14. Develop construction policies to include sustainability.	$$	⚙	$	🕐	🌿	🌍🌍	🌍
15. Use the FAA's Voluntary Airport Low Emissions (VALE) program to transition to low-emission fleet vehicles when practicable.	$	⚙	$	🕐🕐	N/B	N/B	N/B
LONG-TERM OBJECTIVES							
16. Explore composting opportunities for food waste from on-site restaurants.	$$$	⚙⚙⚙⚙	$$$	🕐🕐🕐	N/B	🌍🌍🌍	🌍🌍🌍
17. Incorporate high-efficiency building equipment.	$$	⚙	$	🕐	🌿	🌍	N/B
18. Expand on-site photovoltaic (PV) systems.	$$$$	⚙	$$$	🕐	🌿🌿	🌍🌍	🌍🌍
19. Promote purchase of replacement vehicle and ground support equipment powered with low-emission fuels.	$$$	⚙⚙	$$$	🕐	🌿🌿	🌍	N/B
20. Create an energy audit program for tenants to identify opportunities for energy use reductions.	$$	⚙⚙	$	🕐🕐	🌿	🌍🌍	N/B
21. Improve facility metering to more accurately measure & manage water usage.	$$	⚙⚙	$	🕐🕐	N/B	🌍	N/B
22. Expand on-site bicycle facilities for public use & coordinate with the City to connect the terminal to the citywide bicycle trails & path.	$$	⚙⚙⚙	$	🕐	🌿	🌍🌍	🌍🌍🌍

KEY

Initial Investment
- 1 – < $5,000
- 2 – $5,000 to $100,000
- 3 – $100,000 to $500,000
- 4 – > $500,000

O & M Cost
- N/A – Not Applicable
- 1 – < $5,000 (savings)
- 2 – $5,000 to $50,000
- 3 – $50,000 to $100,000
- 4 – > $100,000

Payback Period
- N/A – Not Applicable
- 1 – 0 to 2 years
- 2 – 2 to 5 years
- 3 – 5 to 15 years
- 4 – > 15 year

Staffing Requirement
- 1 – < 10 hours per month
- 2 – 10-50 hours per month
- 3 – 50 – 200 hours per month

Energy Reduction
- N/B – No benefit
- 1 – Decreases consumption
- 2 – Decreases consumption & generates renewable

Environmental Benefits
- N/B – No benefit
- 1 – Low benefit
- 2 – Moderate benefit
- 3 – Multiple benefits

Social Benefits
- N/B – No benefit
- 1 – Low benefit
- 2 – Moderate benefit
- 3 – Multiple benefits

[1] O & M: Operations and Maintenance

Exhibit 7D
SUSTAINABLE OBJECTIVE EVALUATION

Source: SAGA Sustainable Practices Database, Coffman Associates Analysis, Quest Energy Audit Report (November 2015)

This page intentionally left blank

Annual Sustainability Report Card for the Sunport

Baseline Comparison Year: 2014
Reporting Year: _____

SUSTAINABILITY PERFORMANCE TARGETS	KEY PERFORMANCE INDICATORS	REPORTING YEAR STATUS	BASELINE YEAR DATA	IMPROVEMENT FROM BASELINE YEAR	IMPROVEMENT FROM PREVIOUS YEAR
Waste Management & Recycling	Tons of recycled materials		17.45		
	Tons of solid waste		1,047		
	Composted materials (cubic yards)		260		
	# of airlines participating in recycling program		1		
	# of food concessions participating in composting program		0		
Energy	Electric use (kWhs/year)		14,855,071		
	On-site energy generation (kWhs/year)		2,480,000		
	Energy costs ($/year)[1]		1,460,000		
	Natural gas use (therms/year)		6,796,551.78		
Air Quality & GHG Emissions	# of alternative fuel/low-emission fleet vehicles		1		
	# of low/no emission GSE		0		
	% of low/no emission ground support equipment		0		
	GHG emissions (tons/year)[2]		105,973		
	Vehicle & GSE equipment fuel use (gal/year)[3]		226,824.26		
Water Conservation & Water Quality	Building water use/year (gal/per passenger)		1.99		
	Irrigation water use/year (gal)		53,973,436		
	Reclaimed/grey water use (gal/year)		0		
	Total water use (gal)[4]		66,897,380		
	Total water costs/year[4]		206,561.04		
	# of sub-meters installed		0		
Surface Transportation	# of annual employee/passenger transportation survey responses		0		
	% of employees/passengers using low/no-emission transportation				
	# of public EV stations available		0		
	# of priority parking spaces for carpools & alternatively-fueled vehicles		0		
	Alternative fuel use/year		0		
Natural Resource Management	Annual expenditures on sustainable &/or locally sourced materials		N/A		
	# of concessionaires committed to the Green Concessions Policy		0		
	# of construction/renovation projects with sustainable elements		1		

[1] Energy use costs includes electric & natural gas
[2] GHG's include CO_2, CH_4, N_20, CO_2e
[3] Includes gasoline & diesel
[4] Includes landscape, building & mixed use meters

Were there any issues or challenges implementing any of the Sustainability Performance Targets? (e.g., Additional staffing, funding needed, etc.)

List any lessons learned or best practices for implementation in the following reporting year.

Include/attach any pertinent data that complements the Report Card for record keeping purposes.

FUNDING SOURCES

Financing for the sustainable projects and programs outlined in this appendix can come from various federal, state, and local sources. This section provides a summary of the various funding sources for sustainable projects at airports.

AIP GRANT FUNDING

At the federal level, the FAA provides funding to airports through the AIP. Sustainability projects available for AIP grant funding are discussed below.

FAA Voluntary Airport Low Emissions (VALE) Program[1]

The FAA's VALE program is designed to reduce all sources of airport ground emissions to meet the responsibilities of the *Clean Air Act*. Through the VALE program, airports can use AIP funds and PFCs to purchase low emission vehicles, refueling and recharging stations, gate electrification, and other air quality improvements. VALE funding is currently only available to commercial service airports that are located within areas designated by the Environmental Protection Agency (EPA) as being in non-attainment or maintenance of National Ambient Air Quality Standards (NAAQS). The Sunport currently qualifies for the VALE program; however, due to overall improvements in Bernalillo County air quality, the Sunport may fall out of the VALE program in the future.

Zero Emissions Vehicle and Infrastructure Pilot Program[2]

The FAA's Zero Emissions Vehicle (ZEV) and Infrastructure Pilot Program provides funding to any AIP-eligible airport for AIP grants for the acquisition and operation of ZEVs, including the construction or modification of infrastructure to facilitate the delivery of fuel and services necessary for the use of such vehicles. This program will allow for public access to the refueling/recharging stations under certain conditions. The conditions as outlined in Table 5 of the *Zero Emissions Airport Vehicle and Infrastructure Pilot Program – Technical Guidance, Version 1,* are as follows:

1. Ninety percent of the funded refueling or recharging station capacity is dedicated for on-airport vehicle use. Therefore, only 10 percent of the funded refueling or recharging station capacity can be available for public use.
2. The sponsor must guarantee security and public safety.
3. The sponsor must charge a reasonable fee for the use of the facility. Fees are considered airport revenue.
4. Sponsor vehicles must have priority use of the facility, especially in the event of fuel shortages or emergencies.

[1] More information at: http://www.faa.gov/airports/environmental/vale/
[2] More information at: http://www.faa.gov/airports/environmental/zero_emissions_vehicles/

5. The sponsor must clearly document the number of project ZEVs and public ZEVs that will access the facility.
6. Sponsors must provide letters of commitment to FAA from non-airport ZEV owners at the time of grant application to support their proposed facility use plans. The sponsor must not unreasonably deny access or unjustly discriminate against users requesting access to these federally funded airport facilities.

Program to Increase Energy Efficiency of Airport Power Sources

Section 512 of the FAA *Modernization and Reform Act of 2012* made projects that increase the energy efficiency of airport power sources eligible for AIP funding. Projects that would be eligible under this program include airport energy efficiency assessments, sustainability master plans, energy efficiency projects (specific guidance for what projects would be eligible is currently under development by the FAA). Until this guidance is published, FAA's Airport District Offices (ADOs) must receive approval from the FAA's Airport Planning and Programming (APP) division prior to programming a grant under this program.

Energy Efficiency (Green/Sustainable) Improvement Costs

Funding through the AIP program is available for projects to improve the energy efficiency of a building. The criteria for energy efficiency improvement costs, as detailed in Table 3-44 of the FAA AIP Handbook, are as follows:

a. The cost must be incurred on a measure to improve the efficiency of an airport building (such as a measure designed to meet one or more of the criteria for being considered a high-performance green building) as set forth under Section 401-13 of the *Energy Independence and Security Act of 2007*.
b. Any increases in initial project costs must be offset by expected savings over the life cycle of the project. The sponsor must follow the published FAA guidance for calculating the life cycle cost.
c. For building projects, the cost must be incurred on an otherwise eligible and justified airport building project (improving energy efficiency cannot be the justification). A project to improve a building's energy efficiency is not eligible as a stand-alone project.
d. The cost must only include costs which are necessary for the project, such as those for design, construction, testing, and inspection (not for obtaining LEED or similar certification or credits – which is not a necessary cost of the project).
e. For a building which contains eligible and ineligible areas, all costs associated with the measure (such as design, construction, testing, and inspection) must be prorated accordingly.
f. The sponsor must submit the initial project costs, the expected savings over the life of the project, the life cycle cost calculations, and the proration calculations (for buildings that contain eligible and ineligible areas) to the ADO.

NON-AIP FUNDING SOURCES

The FAA's Airport Cooperative Research Program (ACRP) Synthesis 24, *Strategies and Financing Opportunities for Airport Environmental Programs,* provides a comprehensive summary of funding sources for not only environmental studies and mitigation projects but also for sustainable practices. This report identified several New Mexico state programs that provide funding for environmental or sustainability projects. These programs included the following:

- Energy, Minerals and Natural Resources Department (EMNR) Energy Efficiency and Conservation Block Grant Program – Provides grants with a zero percent local match for projects to reduce energy use and fossil fuel emissions.
- Renewable Energy Transmission Authority (RETA) Revenue Bond Financing – Provides loans for projects to expand use of New Mexico renewable energy resources.
- Environment Department safe water infrastructure programs.
- Environment Department Section 913(h) grant program – Provides grants for projects to reduce nonpoint source pollution.
- Historic Preservation Division (HPD) Certified Local Governments (CLG) Program and Preservation Loan Fund – Provides grants and loans for the preservation of historic and cultural resources.

Local funding sources should also be explored for sustainable projects. According to ACRP Synthesis 24, regional utility companies often offer a variety of financial assistance and incentive programs to encourage the reduction of fossil fuel-based energy consumption. Local and regional planning agencies may also be a source of funding. The Sunport's electric provider, Public Service Company of New Mexico (PNM), offers several rebate programs for business customers, including:

- Retrofit rebates – covers energy-saving upgrades to existing buildings, including prescriptive (lighting, HVAC, refrigeration, and motors) and custom improvements with verifiable electric savings. Custom projects pay $0.06 per kWh for first-year savings.

- New construction program – covers projects that are more energy-efficient than the New Mexico building code requirement. Incentive payments are $0.08 per estimated first-year kWh saved for projects at least 10 percent more efficient than code and $0.10 for projects at least 20 percent more efficient than the code.

- Quick Saver program – provides free energy assessments and rebates (50 percent or more of the cost) for the installation of efficient lighting and refrigeration equipment to qualified customers with monthly peak demands of 100 kW or less.

- Building Tune-Up program – offers incentives for retro-commissioning assessments and measures. Support for training that helps building operators identify energy-efficient opportunities is also available.

- Peak Saver program – open to large customers on qualifying rates, provides quarterly financial incentives to participants in return for voluntarily reducing the amount of energy they use during peak demand days, typically the hottest days of the year. The size of the incentive paid depends on the amount of electricity managed by the program.

Third-Party Financing

Third-party financing is another option for sustainability projects in which agreements are reached between the airport and a private business, which then is allowed to construct on-airport facilities. The ACRP Synthesis 24 gives two examples of this agreement. In one example, a private business invests in the construction of an on-airport CNG refueling station (at no cost to the airport), because of the potential profits from CNG fuel sales. This is a guaranteed energy savings contract (GESC) model based on the concept that third-party providers can earn a profit by selling and installing efficient and renewable energy devices while being reimbursed from the reduction in electric utility costs. In another example, a private business offers to perform solid waste reduction, reuse, and recycling services for airports at no charge, based on the potential revenue stream generated by the sale of recyclable materials. Depending on the type and volume of materials, airports may even generate net revenue from these types of arrangements.

The following is a detailed description of a typical GESC process as provided in ACRP Synthesis 24:

1. The energy services company (ESCO) conducts a comprehensive energy analysis or audit of the facilities and develops recommendations to improve energy efficiency or otherwise reduce energy consumption.
2. The ESCO develops a GESC offer in which it (1) estimates the energy cost savings that will be achieved if the recommendations are followed, (2) guarantees that the savings will be obtained if the ESCO is retained to implement the recommendations, and (3) agrees to be compensated for its work in implementing the recommendations through the energy savings achieved by the facility owner.
3. The ESCO and facility owner execute the GESC.

Other options for third-party financing of sustainability projects, such as solar energy generation projects, include power purchase agreements (PPAs) and solar leases. Under a PPA, the ESCO builds the solar energy system on the airport at no cost to the airport sponsor. The solar energy system offsets the airport's electric utility bill and the ESCO sells the power generated to the airport at a fixed rate, which is oftentimes lower than standard. At the end of the contract term, PPAs can be extended or the sponsor can buy the solar energy system. A lease model is no different than lease agreements for automobiles. A contract is established between the airport sponsor and the ESCO to pay for a solar energy system over a number of years, with the option to purchase the system before the end of the lease term. These third-party funding options can be considered for on-site renewable energy generation projects as they alleviate the Aviation Department from investing large up-front capital costs.

SUSTAINABILITY PLAN SUMMARY

The sustainability plan includes a baseline evaluation of current sustainability performance at the Sunport. The Sunport has already begun to incorporate many sustainable programs and facilities, including on-site electricity generation and low-emission fleet vehicles, among many others. These programs and projects have contributed toward the overall sustainability of the airport and the entire community. Goals and objectives have been established, along with performance targets, to guide the Aviation Department into the future of its sustainability program. The overall sustainability plan has been established with input from Aviation Department staff, the master plan advisory committee, and interested members of the public. The result is a sustainability plan that allows the Aviation Department to continually progress towards its sustainability goals.

This sustainability plan is not intended to be a static document but should be routinely reviewed and updated to consider new opportunities and issues as they arise. While some of the sustainability objectives are one-off capital projects, others are programs that will operate continuously once implemented. To ensure the continued success of these programs, it will take buy-in from Aviation Department staff and, in some cases, tenants of the Sunport. Close coordination with all potential stakeholders is a key to the success of the program.

Ultimately, it is the responsibility of the entire Aviation Department to ensure sustainability is incorporated into everyday operations and decision-making processes. Processes, procedures, and responsibilities for sustainability implementation have already been put in place by the Sunport's *Sustainability Management System* (SMS). Coupled with the SMS, this sustainability master plan should support the Aviation Department in achieving its overall goal of operating one of the greenest airport systems in the country.

Appendix A

GLOSSARY OF TERMS

Sustainable Airport Master Plan

Glossary of Terms

A

ABOVE GROUND LEVEL: The elevation of a point or surface above the ground.

ACCELERATE-STOP DISTANCE AVAILABLE (ASDA): See declared distances.

ADVISORY CIRCULAR: External publications issued by the FAA consisting of nonregulatory material providing for the recommendations relative to a policy, guidance and information relative to a specific aviation subject.

AIR CARRIER: An operator which: (1) performs at least five round trips per week between two or more points and publishes flight schedules which specify the times, days of the week, and places between which such flights are performed; or (2) transports mail by air pursuant to a current contract with the U.S. Postal Service. Certified in accordance with Federal Aviation Regulation (FAR) Parts 121 and 127.

AIRCRAFT: A transportation vehicle that is used or intended for use for flight.

AIRCRAFT APPROACH CATEGORY: A grouping of aircraft based on 1.3 times the stall speed in their landing configuration at their maximum certificated landing weight. The categories are as follows:

- Category A: Speed less than 91 knots.
- Category B: Speed 91 knots or more, but less than 121 knots.
- Category C: Speed 121 knots or more, but less than 141 knots.
- Category D: Speed 141 knots or more, but less than 166 knots.
- Category E: Speed greater than 166 knots.

AIRCRAFT OPERATION: The landing, takeoff, or touch-and-go procedure by an aircraft on a runway at an airport.

AIRCRAFT OPERATIONS AREA (AOA): A restricted and secure area on the airport property designed to protect all aspects related to aircraft operations.

AIRCRAFT OWNERS AND PILOTS ASSOCIATION: A private organization serving the interests and needs of general aviation pilots and aircraft owners.

AIRCRAFT RESCUE AND FIRE FIGHTING: A facility located at an airport that provides emergency vehicles, extinguishing agents, and personnel responsible for minimizing the impacts of an aircraft accident or incident.

AIRFIELD: The portion of an airport which contains the facilities necessary for the operation of aircraft.

AIRLINE HUB: An airport at which an airline concentrates a significant portion of its activity and which often has a significant amount of connecting traffic.

AIRPLANE DESIGN GROUP (ADG): A grouping of aircraft based upon wingspan. The groups are as follows:

- Group I: Up to but not including 49 feet.
- Group II: 49 feet up to but not including 79 feet.
- Group III: 79 feet up to but not including 118 feet.
- Group IV: 118 feet up to but not including 171 feet.
- Group V: 171 feet up to but not including 214 feet.
- Group VI: 214 feet or greater.

AIRPORT AUTHORITY: A quasi-governmental public organization responsible for setting the policies governing the management and operation of an airport or system of airports under its jurisdiction.

AIRPORT BEACON: A navigational aid located at an airport which displays a rotating light beam to identify whether an airport is lighted.

AIRPORT CAPITAL IMPROVEMENT PLAN: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

AIRPORT ELEVATION: The highest point on the runway system at an airport expressed in feet above mean sea level (MSL).

AIRPORT IMPROVEMENT PROGRAM: A program authorized by the Airport and Airway Improvement Act of 1982 that provides funding for airport planning and development.

AIRPORT LAYOUT DRAWING (ALD): The drawing of the airport showing the layout of existing and proposed airport facilities.

AIRPORT LAYOUT PLAN (ALP): A scaled drawing of the existing and planned land and facilities necessary for the operation and development of the airport.

AIRPORT LAYOUT PLAN DRAWING SET: A set of technical drawings depicting the current and future airport conditions. The individual sheets comprising the set can vary with the complexities of the airport, but the FAA-required drawings include the Airport Layout Plan (sometimes referred to as the Airport Layout Drawing (ALD), the Airport Airspace Drawing, and the Inner Portion of the Approach Surface Drawing, On-Airport Land Use Drawing, and Property Map.

AIRPORT MASTER PLAN: The planner's concept of the long-term development of an airport.

AIRPORT MOVEMENT AREA SAFETY SYSTEM: A system that provides automated alerts and warnings of potential runway incursions or other hazardous aircraft movement events.

AIRPORT OBSTRUCTION CHART: A scaled drawing depicting the Federal Aviation Regulation (FAR) Part 77 surfaces, a representation of objects that penetrate these surfaces, runway, taxiway, and ramp areas, navigational aids, buildings, roads and other detail in the vicinity of an airport.

AIRPORT REFERENCE CODE (ARC): A coding system used to relate airport design criteria to the operational (Aircraft Approach Category) to the physical characteristics (Airplane Design Group) of the airplanes intended to operate at the airport.

AIRPORT REFERENCE POINT (ARP): The latitude and longitude of the approximate center of the airport.

AIRPORT SPONSOR: The entity that is legally responsible for the management and operation of an airport, including the fulfillment of the requirements of laws and regulations related thereto.

AIRPORT SURFACE DETECTION EQUIPMENT: A radar system that provides air traffic controllers with a visual representation of the movement of aircraft and other vehicles on the ground on the airfield at an airport.

AIRPORT SURVEILLANCE RADAR: The primary radar located at an airport or in an air traffic control terminal area that receives a signal at an antenna and transmits the signal to air traffic control display equipment defining the location of aircraft in the air. The signal provides only the azimuth and range of aircraft from the location of the antenna.

AIRPORT TRAFFIC CONTROL TOWER (ATCT): A central operations facility in the terminal air traffic control system, consisting of a tower, including an associated instrument flight rule (IFR) room if radar equipped, using air/ground communications and/or radar, visual signaling and other devices to provide safe and expeditious movement of terminal air traffic.

AIR ROUTE TRAFFIC CONTROL CENTER: A facility which provides en route air traffic control service to aircraft operating on an IFR flight plan within controlled airspace over a large, multi-state region.

AIRSIDE: The portion of an airport that contains the facilities necessary for the operation of aircraft.

AIRSPACE: The volume of space above the surface of the ground that is provided for the operation of aircraft.

AIR TAXI: An air carrier certificated in accordance with FAR Part 121 and FAR Part 135 and authorized to provide, on demand, public transportation of persons and property by aircraft. Generally operates small aircraft "for hire" for specific trips.

AIR TRAFFIC CONTROL: A service operated by an appropriate organization for the purpose of providing for the safe, orderly, and expeditious flow of air traffic.

AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC): A facility established to provide air traffic control service to aircraft operating on an IFR flight plan within controlled airspace and principally during the en route phase of flight.

AIR TRAFFIC CONTROL SYSTEM COMMAND CENTER: A facility operated by the FAA which is responsible for the central flow control, the central altitude reservation system, the airport reservation position system, and the air traffic service contingency command for the air traffic control system.

AIR TRAFFIC HUB: A categorization of commercial service airports or group of commercial service airports in a metropolitan or urban area based upon the proportion of annual national enplanements existing at the airport or airports. The categories are large hub, medium hub, small hub, or non-hub. It forms the basis for the apportionment of entitlement funds.

AIR TRANSPORT ASSOCIATION OF AMERICA: An organization consisting of the principal U.S. airlines that represents the interests of the airline industry on major aviation issues before federal, state, and local government bodies. It promotes air transportation safety by coordinating industry and governmental safety programs and it serves as a focal point for industry efforts to standardize practices and enhance the efficiency of the air transportation system.

ALERT AREA: See special-use airspace.

ALTITUDE: The vertical distance measured in feet above mean sea level.

ANNUAL INSTRUMENT APPROACH (AIA): An approach to an airport with the intent to land by an aircraft in accordance with an IFR flight plan when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude.

APPROACH LIGHTING SYSTEM (ALS): An airport lighting facility which provides visual guidance to landing aircraft by radiating light beams by which the pilot aligns the aircraft with the extended centerline of the runway on his final approach and landing.

APPROACH MINIMUMS: The altitude below which an aircraft may not descend while on an IFR approach unless the pilot has the runway in sight.

APPROACH SURFACE: An imaginary obstruction limiting surface defined in FAR Part 77 which is longitudinally centered on an extended runway centerline and extends outward and upward from the primary surface at each end of a runway at a designated slope and distance based upon the type of available or planned approach by aircraft to a runway.

APRON: A specified portion of the airfield used for passenger, cargo or freight loading and unloading, aircraft parking, and the refueling, maintenance and servicing of aircraft.

AREA NAVIGATION: The air navigation procedure that provides the capability to establish and maintain a flight path on an arbitrary course that remains within the coverage area of navigational sources being used.

AUTOMATED TERMINAL INFORMATION SERVICE (ATIS): The continuous broadcast of recorded non-control information at towered airports. Information typically includes wind speed, direction, and runway in use.

AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS): A reporting system that provides frequent airport ground surface weather observation data through digitized voice broadcasts and printed reports.

AUTOMATIC WEATHER OBSERVATION STATION (AWOS): Equipment used to automatically record weather conditions (i.e. cloud height, visibility, wind speed and direction, temperature, dew point, etc.)

AUTOMATIC DIRECTION FINDER (ADF): An aircraft radio navigation system which senses and indicates the direction to a non-directional radio beacon (NDB) ground transmitter.

AVIGATION EASEMENT: A contractual right or a property interest in land over which a right of unobstructed flight in the airspace is established.

AZIMUTH: Horizontal direction expressed as the angular distance between true north and the direction of a fixed point (as the observer's heading).

B

BASE LEG: A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline. See "traffic pattern."

BASED AIRCRAFT: The general aviation aircraft that use a specific airport as a home base.

BEARING: The horizontal direction to or from any point, usually measured clockwise from true north or magnetic north.

BLAST FENCE: A barrier used to divert or dissipate jet blast or propeller wash.

BLAST PAD: A prepared surface adjacent to the end of a runway for the purpose of eliminating the erosion of the ground surface by the wind forces produced by airplanes at the initiation of takeoff operations.

BUILDING RESTRICTION LINE (BRL): A line which identifies suitable building area locations on the airport.

C

CAPITAL IMPROVEMENT PLAN: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute Airport Improvement Program funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

CARGO SERVICE AIRPORT: An airport served by aircraft providing air transportation of property only, including mail, with an annual aggregate landed weight of at least 100,000,000 pounds.

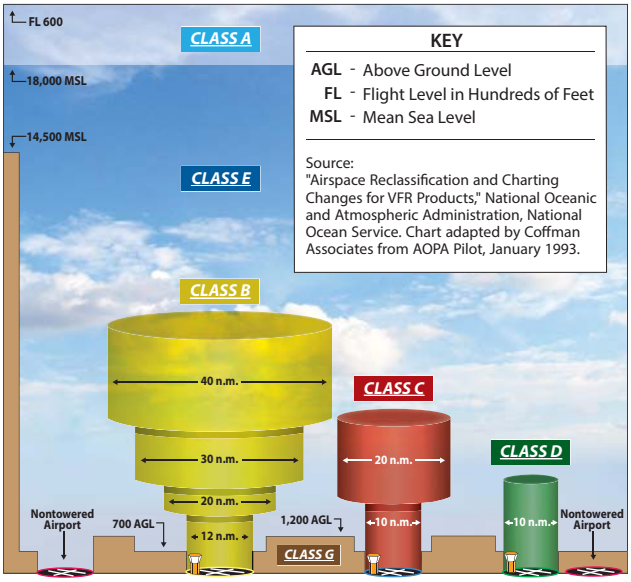
CATEGORY I: An Instrument Landing System (ILS) that provides acceptable guidance information to an aircraft from the coverage limits of the ILS to the point at which the localizer course line intersects the glide path at a decision height of 200 feet above the horizontal plane containing the runway threshold.

CATEGORY II: An ILS that provides acceptable guidance information to an aircraft from the coverage limits of the ILS to the point at which the localizer course line intersects the glide path at a decision height of 100 feet above the horizontal plane containing the runway threshold.

CATEGORY III: An ILS that provides acceptable guidance information to a pilot from the coverage limits of the ILS with no decision height specified above the horizontal plane containing the runway threshold.

CEILING: The height above the ground surface to the location of the lowest layer of clouds which is reported as either broken or overcast.

CIRCLING APPROACH: A maneuver initiated by the pilot to align the aircraft with the runway for landing when flying a predetermined circling instrument approach under IFR.



CLASS A AIRSPACE: See Controlled Airspace.

CLASS B AIRSPACE: See Controlled Airspace.

CLASS C AIRSPACE: See Controlled Airspace.

CLASS D AIRSPACE: See Controlled Airspace.

CLASS E AIRSPACE: See Controlled Airspace.

CLASS G AIRSPACE: See Controlled Airspace.

CLEAR ZONE: See Runway Protection Zone.

COMMERCIAL SERVICE AIRPORT: A public airport providing scheduled passenger service that enplanes at least 2,500 annual passengers.

COMMON TRAFFIC ADVISORY FREQUENCY: A radio frequency identified in the appropriate aeronautical chart which is designated for the purpose of transmitting airport advisory information and procedures while operating to or from an uncontrolled airport.

COMPASS LOCATOR (LOM): A low power, low/medium frequency radio-beacon installed in conjunction with the instrument landing system at one or two of the marker sites.

CONICAL SURFACE: An imaginary obstruction-limiting surface defined in FAR Part 77 that extends

from the edge of the horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

CONTROLLED AIRPORT: An airport that has an operating airport traffic control tower.

CONTROLLED AIRSPACE: Airspace of defined dimensions within which air traffic control services are provided to instrument flight rules (IFR) and visual flight rules (VFR) flights in accordance with the airspace classification. Controlled airspace in the United States is designated as follows:

- **CLASS A**: Generally, the airspace from 18,000 feet mean sea level (MSL) up to but not including flight level FL600. All persons must operate their aircraft under IFR.

- **CLASS B**:
  Generally, the airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports. The configuration of Class B airspace is unique to each airport, but typically consists of two or more layers of air space and is designed to contain all published instrument approach procedures to the airport. An air traffic control clearance is required for all aircraft to operate in the area.

- **CLASS C**: Generally, the airspace from the surface to 4,000 feet above the airport elevation (charted as MSL) surrounding those airports that have an operational control tower and radar approach control and are served by a qualifying number of IFR operations or passenger enplanements. Although individually tailored for each airport, Class C airspace typically consists of a surface area with a five nautical mile (nm) radius and an outer area with a 10 nautical mile radius that extends from 1,200 feet to 4,000 feet above the airport elevation. Two-way radio communication is required for all aircraft.

- **CLASS D**: Generally, that airspace from the surface to 2,500 feet above the air port elevation (charted as MSL) surrounding those airports that have an operational control tower. Class D airspace is individually tailored and configured to encompass published instrument approach procedure. Unless otherwise authorized, all persons must establish two-way radio communication.

- **CLASS E**: Generally, controlled airspace that is not classified as Class A, B, C, or D. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. When designated as a surface area, the airspace will be configured to contain all instrument procedures. Class E airspace encompasses all Victor Airways. Only aircraft following instrument flight rules are required to establish two-way radio communication with air traffic control.

- **CLASS G**: Generally, that airspace not classified as Class A, B, C, D, or E. Class G airspace is uncontrolled for all aircraft. Class G airspace extends from the surface to the overlying Class E airspace.

CONTROLLED FIRING AREA: See special-use airspace.

CROSSWIND: A wind that is not parallel to a runway centerline or to the intended flight path of an aircraft.

CROSSWIND COMPONENT: The component of wind that is at a right angle to the runway centerline or the intended flight path of an aircraft.

CROSSWIND LEG: A flight path at right angles to the landing runway off its upwind end. See "traffic pattern."

D

DECIBEL: A unit of noise representing a level relative to a reference of a sound pressure 20 micro newtons per square meter.

DECISION HEIGHT/ DECISION ALTITUDE: The height above the end of the runway surface at which a decision must be made by a pilot during the ILS or Precision Approach Radar approach to either continue the approach or to execute a missed approach.

DECLARED DISTANCES: The distances declared available for the airplane's takeoff runway, takeoff distance, accelerate-stop distance, and landing distance requirements. The distances are:

- **TAKEOFF RUNWAY AVAILABLE (TORA):** The runway length declared available and suitable for the ground run of an airplane taking off.

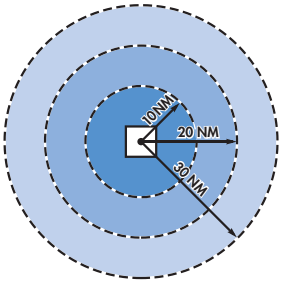
- **TAKEOFF DISTANCE AVAILABLE (TODA):** The TORA plus the length of any remaining runway and/or clear way beyond the far end of the TORA.
- **ACCELERATE-STOP DISTANCE AVAILABLE (ASDA):** The runway plus stopway length declared available for the acceleration and deceleration of an aircraft aborting a takeoff.
- **LANDING DISTANCE AVAILABLE (LDA):** The runway length declared available and suitable for landing.

DEPARTMENT OF TRANSPORTATION: The cabinet level federal government organization consisting of modal operating agencies, such as the Federal Aviation Administration, which was established to promote the coordination of federal transportation programs and to act as a focal point for research and development efforts in transportation.

DISCRETIONARY FUNDS: Federal grant funds that may be appropriated to an airport based upon designation by the Secretary of Transportation or Congress to meet a specified national priority such as enhancing capacity, safety, and security, or mitigating noise.

DISPLACED THRESHOLD: A threshold that is located at a point on the runway other than the designated beginning of the runway.

DISTANCE MEASURING EQUIPMENT (DME): Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance of an aircraft from the DME navigational aid.



DNL: The 24-hour average sound level, in Aweighted decibels, obtained after the addition of ten decibels to sound levels for the periods between 10 p.m. and 7 a.m. as averaged over a span of one year. It is the FAA standard metric for determining the cumulative exposure of individuals to noise.

DOWNWIND LEG: A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg. Also see "traffic pattern."

E

EASEMENT: The legal right of one party to use a portion of the total rights in real estate owned by another party. This may include the right of passage over, on, or below the property; certain air rights above the property, including view rights; and the rights to any specified form of development or activity, as well as any other legal rights in the property that may be specified in the easement document.

ELEVATION: The vertical distance measured in feet above mean sea level.

ENPLANED PASSENGERS: The total number of revenue passengers boarding aircraft, including originating, stop-over, and transfer passengers, in scheduled and nonscheduled services.

ENPLANEMENT: The boarding of a passenger, cargo, freight, or mail on an aircraft at an airport.

ENTITLEMENT: Federal funds for which a commercial service airport may be eligible based upon its annual passenger enplanements.

ENVIRONMENTAL ASSESSMENT (EA): An environmental analysis performed pursuant to the National Environmental Policy Act to determine whether an action would significantly affect the environment and thus require a more detailed environmental impact statement.

ENVIRONMENTAL AUDIT: An assessment of the current status of a party's compliance with applicable environmental requirements of a party's environmental compliance policies, practices, and controls.

ENVIRONMENTAL IMPACT STATEMENT (EIS): A document required of federal agencies by the National Environmental Policy Act for major projects are legislative proposals affecting the environment. It is a tool for decision-making describing the positive and negative effects of a proposed action and citing alternative actions.

ESSENTIAL AIR SERVICE: A federal program which guarantees air carrier service to selected small cities by providing subsidies as needed to prevent these cities from such service.

F

FEDERAL AVIATION REGULATIONS: The general and permanent rules established by the executive departments and agencies of the Federal Government for aviation, which are published in the Federal Register. These are the aviation subset of the Code of Federal Regulations.

FEDERAL INSPECTION SERVICES: The provision of customs and immigration services including passport inspection, inspection of baggage, the collection of duties on certain imported items, and the inspections for agricultural products, illegal drugs, or other restricted items.

FINAL APPROACH: A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway. See "traffic pattern."

FINAL APPROACH AND TAKEOFF AREA (FATO). A defined area over which the final phase of the helicopter approach to a hover, or a landing is completed and from which the takeoff is initiated.

FINAL APPROACH FIX: The designated point at which the final approach segment for an aircraft landing on a runway begins for a non-precision approach.

FINDING OF NO SIGNIFICANT IMPACT (FONSI): A public document prepared by a Federal agency that presents the rationale why a proposed action will not have a significant effect on the environment and for which an environmental impact statement will not be prepared.

FIXED BASE OPERATOR (FBO): A provider of services to users of an airport. Such services include, but are not limited to, hangaring, fueling, flight training, repair, and maintenance.

FLIGHT LEVEL: A measure of altitude used by aircraft flying above 18,000 feet. Flight levels are indicated by three digits representing the pressure altitude in hundreds of feet. An airplane flying at flight level 360 is flying at a pressure altitude of 36,000 feet. This is expressed as FL 360.

FLIGHT SERVICE STATION: An operations facility in the national flight advisory system which utilizes data interchange facilities for the collection and dissemination of Notices to Airmen, weather, and administrative data and which provides pre-flight and in-flight advisory services to pilots through air and ground based communication facilities.

FRANGIBLE NAVAID: A navigational aid which retains its structural integrity and stiffness up to a designated maximum load, but on impact from a greater load, breaks, distorts, or yields in such a manner as to present the minimum hazard to aircraft.

G

GENERAL AVIATION: That portion of civil aviation which encompasses all facets of aviation except air carriers holding a certificate of convenience and necessity, and large aircraft commercial operators.

GENERAL AVIATION AIRPORT: An airport that provides air service to only general aviation.

GLIDESLOPE (GS): Provides vertical guidance for aircraft during approach and landing. The glideslope consists of the following:

1. Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ILS; or

2. Visual ground aids, such as VASI, which provide vertical guidance for VFR approach or for the visual portion of an instrument approach and landing.

GLOBAL POSITIONING SYSTEM (GPS): A system of 48 satellites used as reference points to enable navigators equipped with GPS receivers to determine their latitude, longitude, and altitude.

GROUND ACCESS: The transportation system on and around the airport that provides access to and from the airport by ground transportation vehicles for passengers, employees, cargo, freight, and airport services.

H

HELIPAD: A designated area for the takeoff, landing, and parking of helicopters.

HIGH INTENSITY RUNWAY LIGHTS: The highest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

HIGH-SPEED EXIT TAXIWAY: A long radius taxiway designed to expedite aircraft turning off the runway after landing (at speeds to 60 knots), thus reducing runway occupancy time.

HORIZONTAL SURFACE: An imaginary obstruction-limiting surface defined in FAR Part 77 that is specified as a portion of a horizontal plane surrounding a runway located 150 feet above the established airport elevation. The specific horizontal dimensions of this surface are a function of the types of approaches existing or planned for the runway.

I

INITIAL APPROACH FIX: The designated point at which the initial approach segment begins for an instrument approach to a runway.

INSTRUMENT APPROACH PROCEDURE: A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually.

INSTRUMENT FLIGHT RULES (IFR): Procedures for the conduct of flight in weather conditions below Visual Flight Rules weather minimums. The term IFR is often also used to define weather conditions and the type of flight plan under which an aircraft is operating.

INSTRUMENT LANDING SYSTEM (ILS): A precision instrument approach system which normally consists of the following electronic components and visual aids:

1. Localizer.
2. Glide Slope.
3. Outer Marker.
4. Middle Marker.
5. Approach Lights.

INSTRUMENT METEOROLOGICAL CONDITIONS: Meteorological conditions expressed in terms of specific visibility and ceiling conditions that are less than the minimums specified for visual meteorological conditions.

ITINERANT OPERATIONS: Operations by aircraft that are not based at a specified airport.

K

KNOTS: A unit of speed length used in navigation that is equivalent to the number of nautical miles traveled in one hour.

L

LANDSIDE: The portion of an airport that provides the facilities necessary for the processing of passengers, cargo, freight, and ground transportation vehicles.

LANDING DISTANCE AVAILABLE (LDA): See declared distances.

LARGE AIRPLANE: An airplane that has a maximum certified takeoff weight in excess of 12,500 pounds.

LOCAL AREA AUGMENTATION SYSTEM: A differential GPS system that provides localized measurement correction signals to the basic GPS signals to improve navigational accuracy integrity, continuity, and availability.

LOCAL OPERATIONS: Aircraft operations performed by aircraft that are based at the airport and that operate in the local traffic pattern or within sight of the airport, that are known to be departing for or arriving from flights in local practice areas within a prescribed distance from the airport, or that execute simulated instrument approaches at the airport.

LOCAL TRAFFIC: Aircraft operating in the traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from the local practice areas, or aircraft executing practice instrument approach procedures. Typically, this includes touch and-go training operations.

LOCALIZER: The component of an ILS which provides course guidance to the runway.

LOCALIZER TYPE DIRECTIONAL AID (LDA): A facility of comparable utility and accuracy to a localizer, but is not part of a complete ILS and is not aligned with the runway.

LONG RANGE NAVIGATION SYSTEM (LORAN): Long range navigation is an electronic navigational aid which determines aircraft position and speed by measuring the difference in the time of reception of synchronized pulse signals from two fixed transmitters. Loran is used for en route navigation.

LOW INTENSITY RUNWAY LIGHTS: The lowest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

M

MEDIUM INTENSITY RUNWAY LIGHTS: The middle classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

MICROWAVE LANDING SYSTEM (MLS): An instrument approach and landing system that provides precision guidance in azimuth, elevation, and distance measurement.

MILITARY OPERATIONS: Aircraft operations that are performed in military aircraft.

MILITARY OPERATIONS AREA (MOA): See special-use airspace

MILITARY TRAINING ROUTE: An air route depicted on aeronautical charts for the conduct of military flight training at speeds above 250 knots.

MISSED APPROACH COURSE (MAC): The flight route to be followed if, after an instrument approach, a landing is not affected, and occurring normally:

1. When the aircraft has descended to the decision height and has not established visual contact; or

2. When directed by air traffic control to pull up or to go around again.

MOVEMENT AREA: The runways, taxiways, and other areas of an airport which are utilized for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports with a tower, air traffic control clearance is required for entry onto the movement area.

N

NATIONAL AIRSPACE SYSTEM: The network of air traffic control facilities, air traffic control areas, and navigational facilities through the U.S.

NATIONAL PLAN OF INTEGRATED AIRPORT SYSTEMS: The national airport system plan developed by the Secretary of Transportation on a biannual basis for the development of public use airports to meet national air transportation needs.

NATIONAL TRANSPORTATION SAFETY BOARD: A federal government organization established to investigate and determine the probable cause of transportation accidents, to recommend equipment and procedures to enhance transportation safety, and to review on appeal the suspension or revocation of any certificates or licenses issued by the Secretary of Transportation.

NAUTICAL MILE: A unit of length used in navigation which is equivalent to the distance spanned by one minute of arc in latitude, that is, 1,852 meters or 6,076 feet. It is equivalent to approximately 1.15 statute mile.

NAVAID: A term used to describe any electrical or visual air navigational aids, lights, signs, and associated supporting equipment (i.e. PAPI, VASI, ILS, etc.)

NAVIGATIONAL AID: A facility used as, available for use as, or designed for use as an aid to air navigation.

NOISE CONTOUR: A continuous line on a map of the airport vicinity connecting all points of the same noise exposure level.

NON-DIRECTIONAL BEACON (NDB): A beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his or her bearing to and from the radio beacon and home on, or track to, the station. When the radio beacon is installed in conjunction with the Instrument Landing System marker, it is normally called a Compass Locator.

NON-PRECISION APPROACH PROCEDURE: A standard instrument approach procedure in which no electronic glide slope is provided, such as VOR, TACAN, NDB, or LOC.

NOTICE TO AIRMEN: A notice containing information concerning the establishment, condition, or change in any component of or hazard in the National Airspace System, the timely knowledge of which is considered essential to personnel concerned with flight operations.

O

OBJECT FREE AREA (OFA): An area on the ground centered on a runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

OBSTACLE FREE ZONE (OFZ): The airspace below 150 feet above the established airport elevation and along the runway and extended runway centerline that is required to be kept clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance for aircraft landing or taking off from the runway, and for missed approaches.

ONE-ENGINE INOPERABLE SURFACE: A surface emanating from the runway end at a slope ratio of 62.5:1. Air carrier airports are required to maintain a technical drawing of this surface depicting any object penetrations by January 1, 2010.

OPERATION: The take-off, landing, or touch-and-go procedure by an aircraft on a runway at an airport.

OUTER MARKER (OM): An ILS navigation facility in the terminal area navigation system located four to seven miles from the runway edge on the extended centerline, indicating to the pilot that he/she is passing over the facility and can begin final approach.

P

PILOT CONTROLLED LIGHTING: Runway lighting systems at an airport that are controlled by activating the microphone of a pilot on a specified radio frequency.

PRECISION APPROACH: A standard instrument approach procedure which provides runway alignment and glide slope (descent) information. It is categorized as follows:

- **CATEGORY I (CAT I)**: A precision approach which provides for approaches with a decision height of not less than 200 feet and visibility not less than 1/2 mile or Runway Visual Range (RVR) 2400 (RVR 1800) with operative touchdown zone and runway centerline lights.
- **CATEGORY II (CAT II)**: A precision approach which provides for approaches with a decision height of not less than 100 feet and visibility not less than 1200 feet RVR.
- **CATEGORY III (CAT III)**: A precision approach which provides for approaches with minima less than Category II.

PRECISION APPROACH PATH INDICATOR (PAPI): A lighting system providing visual approach slope guidance to aircraft during a landing approach. It is similar to a VASI but provides a sharper transition between the colored indicator lights.

PRECISION APPROACH RADAR: A radar facility in the terminal air traffic control system used to detect and display with a high degree of accuracy the direction, range, and elevation of an aircraft on the final approach to a runway.

PRECISION OBJECT FREE AREA (POFA): An area centered on the extended runway centerline, beginning at the runway threshold and extending behind the runway threshold that is 200 feet long by 800 feet wide. The POFA is a clearing standard which requires the POFA to be kept clear of above ground objects protruding above the runway safety area edge elevation (except for frangible NAVAIDS). The POFA applies to all new authorized instrument approach procedures with less than 3/4 mile visibility.

PRIMARY AIRPORT: A commercial service airport that enplanes at least 10,000 annual passengers.

PRIMARY SURFACE: An imaginary obstruction limiting surface defined in FAR Part 77 that is specified as a rectangular surface longitudinally centered about a runway. The specific dimensions of this surface are a function of the types of approaches existing or planned for the runway.

PROHIBITED AREA: See special-use airspace.

PVC: Poor visibility and ceiling. Used in determining Annual Service Volume. PVC conditions exist when the cloud ceiling is less than 500 feet and visibility is less than one mile.

R

RADIAL: A navigational signal generated by a Very High Frequency Omni-directional Range or VORTAC station that is measured as an azimuth from the station.

REGRESSION ANALYSIS: A statistical technique that seeks to identify and quantify the relationships between factors associated with a forecast.

REMOTE COMMUNICATIONS OUTLET (RCO): An unstaffed transmitter receiver/facility remotely controlled by air traffic personnel. RCOs serve flight service stations (FSSs). RCOs were established to provide ground-to-ground communications between air traffic control specialists and pilots at satellite airports for delivering en route clearances, issuing departure authorizations, and acknowledging instrument flight rules cancellations or departure/ landing times.

REMOTE TRANSMITTER/RECEIVER (RTR): See remote communications outlet. RTRs serve ARTCCs.

RELIEVER AIRPORT: An airport to serve general aviation aircraft which might otherwise use a congested air-carrier served airport.

RESTRICTED AREA: See special-use airspace.

RNAV: Area navigation - airborne equipment which permits flights over determined tracks within prescribed accuracy tolerances without the need to overfly ground-based navigation facilities. Used en route and for approaches to an airport.

RUNWAY: A defined rectangular area on an airport prepared for aircraft landing and takeoff. Runways are normally numbered in relation to their magnetic direction, rounded off to the nearest 10 degrees. For example, a runway with a magnetic heading of 180 would be designated Runway 18. The runway heading on the opposite end of the runway is 180 degrees from that runway end. For example, the opposite runway heading for Runway 18 would be Runway 36 (magnetic heading of 360). Aircraft can takeoff or land from either end of a runway, depending upon wind direction.

RUNWAY ALIGNMENT INDICATOR LIGHT: A series of high intensity sequentially flashing lights installed on the extended centerline of the runway usually in conjunction with an approach lighting system.

RUNWAY DESIGN CODE: A code signifiying the design standards to which the runway is to be built.

RUNWAY END IDENTIFICATION LIGHTING (REIL): Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.

RUNWAY GRADIENT: The average slope, measured in percent, between the two ends of a runway.

RUNWAY PROTECTION ZONE (RPZ): An area off the runway end to enhance the protection of people and property on the ground. The RPZ is trapezoidal in shape. Its dimensions are determined by the aircraft approach speed and runway approach type and minima.

RUNWAY REFERENCE CODE: A code signifying the current operational capabilities of a runway and associated taxiway.

RUNWAY SAFETY AREA (RSA): A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.

RUNWAY VISIBILITY ZONE (RVZ): An area on the airport to be kept clear of permanent objects so that there is an unobstructed line of- site from any point five feet above the runway centerline to any point five feet above an intersecting runway centerline.

RUNWAY VISUAL RANGE (RVR): An instrumentally derived value, in feet, representing the horizontal distance a pilot can see down the runway from the runway end.

S

SCOPE: The document that identifies and defines the tasks, emphasis, and level of effort associated with a project or study.

SEGMENTED CIRCLE: A system of visual indicators designed to provide traffic pattern information at airports without operating control towers.

SHOULDER: An area adjacent to the edge of paved runways, taxiways, or aprons providing a transition between the pavement and the adjacent surface; support for aircraft running off the pavement; enhanced drainage; and blast protection. The shoulder does not necessarily need to be paved.

SLANT-RANGE DISTANCE: The straight line distance between an aircraft and a point on the ground.

SMALL AIRCRAFT: An aircraft that has a maximum certified takeoff weight of up to 12,500 pounds.

SPECIAL-USE AIRSPACE: Airspace of defined dimensions identified by a surface area wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. Special-use airspace classifications include:

- **ALERT AREA**: Airspace which may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft.
- **CONTROLLED FIRING AREA**: Airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to nonparticipating aircraft and to ensure the safety of persons or property on the ground.
- **MILITARY OPERATIONS AREA (MOA)**: Designated airspace with defined vertical and lateral dimensions established outside Class A airspace to separate/segregate certain military activities from instrument flight rule (IFR) traffic and to identify for visual flight rule (VFR) traffic where these activities are conducted.
- **PROHIBITED AREA**: Designated airspace within which the flight of aircraft is prohibited.
- **RESTRICTED AREA**: Airspace designated under Federal Aviation Regulation (FAR) 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated joint use. When not in use by the using agency, IFR/VFR operations can be authorized by the controlling air traffic control facility.
- **WARNING AREA:** Airspace which may contain hazards to nonparticipating aircraft.

STANDARD INSTRUMENT DEPARTURE (SID): A preplanned coded air traffic control IFR departure routing, preprinted for pilot use in graphic and textual form only.

STANDARD INSTRUMENT DEPARTURE PROCEDURES: A published standard flight procedure to be utilized following takeoff to provide a transition between the airport and the terminal area or en route airspace.

STANDARD TERMINAL ARRIVAL ROUTE (STAR): A preplanned coded air traffic control IFR arrival routing, preprinted for pilot use in graphic and textual or textual form only.

STOP-AND-GO: A procedure wherein an aircraft will land, make a complete stop on the runway, and then commence a takeoff from that point. A stop-and-go is recorded as two operations: one operation for the landing and one operation for the takeoff.

STOPWAY: An area beyond the end of a takeoff runway that is designed to support an aircraft during an aborted takeoff without causing structural damage to the aircraft. It is not to be used for takeoff, landing, or taxiing by aircraft.

STRAIGHT-IN LANDING/APPROACH: A landing made on a runway aligned within 30 degrees of the final approach course following completion of an instrument approach.

T

TACTICAL AIR NAVIGATION (TACAN): An ultrahigh frequency electronic air navigation system which provides suitably-equipped aircraft a continuous indication of bearing and distance to the TACAN station.

TAKEOFF RUNWAY AVAILABLE (TORA):
See declared distances.

TAKEOFF DISTANCE AVAILABLE (TODA):
See declared distances.

TAXILANE: The portion of the aircraft parking area used for access between taxiways and aircraft parking positions.

TAXIWAY: A defined path established for the taxiing of aircraft from one part of an airport to another.

TAXIWAY DESIGN GROUP: A classification of airplanes based on outer to outer Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance.

TAXIWAY SAFETY AREA (TSA): A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway.

TERMINAL INSTRUMENT PROCEDURES: Published flight procedures for conducting instrument approaches to runways under instrument meteorological conditions.

TERMINAL RADAR APPROACH CONTROL: An element of the air traffic control system responsible for monitoring the en-route and terminal segment of air traffic in the airspace surrounding airports with moderate to high levels of air traffic.

TETRAHEDRON: A device used as a landing direction indicator. The small end of the tetrahedron points in the direction of landing.

THRESHOLD: The beginning of that portion of the runway available for landing. In some instances the landing threshold may be displaced.

TOUCH-AND-GO: An operation by an aircraft that lands and departs on a runway without stopping or exiting the runway. A touch-and go is recorded as two operations: one operation for the landing and one operation for the takeoff.

TOUCHDOWN: The point at which a landing aircraft makes contact with the runway surface.

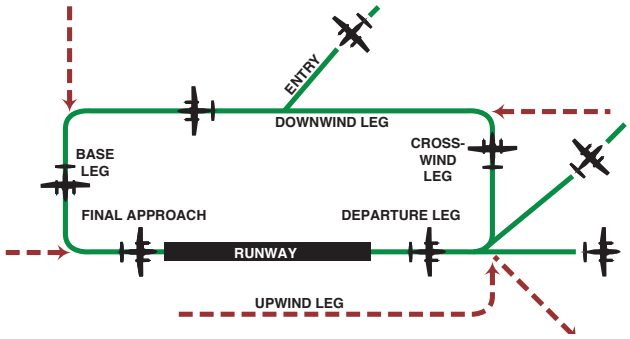
TOUCHDOWN AND LIFT-OFF AREA (TLOF): A load bearing, generally paved area, normally centered in the FATO, on which the helicopter lands or takes off.

TOUCHDOWN ZONE (TDZ): The first 3,000 feet of the runway beginning at the threshold.

TOUCHDOWN ZONE ELEVATION (TDZE): The highest elevation in the touchdown zone.

TOUCHDOWN ZONE (TDZ) LIGHTING: Two rows of transverse light bars located symmetrically about the runway centerline normally at 100- foot intervals. The basic system extends 3,000 feet along the runway.

TRAFFIC PATTERN: The traffic flow that is prescribed for aircraft landing at or taking off from an airport. The components of a typical traffic pattern are the upwind leg, crosswind leg, downwind leg, base leg, and final approach.



U

UNCONTROLLED AIRPORT: An airport without an air traffic control tower at which the control of Visual Flight Rules traffic is not exercised.

UNCONTROLLED AIRSPACE: Airspace within which aircraft are not subject to air traffic control.

UNIVERSAL COMMUNICATION (UNICOM):
A nongovernment communication facility which may provide airport information at certain airports. Locations and frequencies of UNICOM's are shown on aeronautical charts and publications.

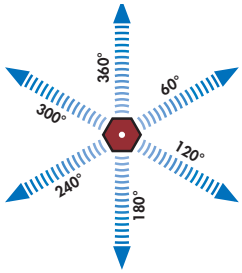
UPWIND LEG: A flight path parallel to the landing runway in the direction of landing. See "traffic pattern."

V

VECTOR: A heading issued to an aircraft to provide navigational guidance by radar.

VERY HIGH FREQUENCY/ OMNIDIRECTIONAL RANGE (VOR): A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the national airspace system. The VOR periodically identifies itself by Morse Code and may have an additional voice identification feature.

VERY HIGH FREQUENCY OMNI-DIRECTIONAL RANGE/ TACTICAL AIR NAVIGATION (VORTAC): A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance-measuring equipment (DME) at one site.



VICTOR AIRWAY: A control area or portion thereof established in the form of a corridor, the centerline of which is defined by radio navigational aids.

VISUAL APPROACH: An approach wherein an aircraft on an IFR flight plan, operating in VFR conditions under the control of an air traffic control facility and having an air traffic control authorization, may proceed to the airport of destination in VFR conditions.

VISUAL APPROACH SLOPE INDICATOR (VASI): An airport lighting facility providing vertical visual approach slope guidance to aircraft during approach to landing by radiating a directional pattern of high intensity red and white focused light beams which indicate to the pilot that he is on path if he sees red/ white, above path if white/white, and below path if red/red. Some airports serving large aircraft have three-bar VASI's which provide two visual guide paths to the same runway.

VISUAL FLIGHT RULES (VFR): Rules that govern the procedures for conducting flight under visual conditions. The term VFR is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

VISUAL METEOROLOGICAL CONDITIONS: Meteorological conditions expressed in terms of specific visibility and ceiling conditions which are equal to or greater than the threshold values for instrument meteorological conditions.

VOR: See "Very High Frequency Omnidirectional Range Station."

VORTAC: See "Very High Frequency Omnidirectional Range Station/Tactical Air Navigation."

W

WARNING AREA: See special-use airspace.

WIDE AREA AUGMENTATION SYSTEM: An enhancement of the Global Positioning System that includes integrity broadcasts, differential corrections, and additional ranging signals for the purpose of providing the accuracy, integrity, availability, and continuity required to support all phases of flight.

Abbreviations

AC: advisory circular

ADF: automatic direction finder

ADG: airplane design group

AFSS: automated flight service station

AGL: above ground level

AIA: annual instrument approach

AIP: Airport Improvement Program

AIR-21: Wendell H. Ford Aviation Investment and Reform Act for the 21st Century

ALS: approach lighting system

ALSF-1: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT I configuration)

ALSF-2: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT II configuration)

AOA: Aircraft Operation Area

APV: instrument approach procedure with vertical guidance

ARC: airport reference code

ARFF: aircraft rescue and fire fighting

ARP: airport reference point

ARTCC: air route traffic control center

ASDA: accelerate-stop distance available

ASR: airport surveillance radar

ASOS: automated surface observation station

ATCT: airport traffic control tower

ATIS: automated terminal information service

AVGAS: aviation gasoline - typically 100 low lead (100LL)

AWOS: automatic weather observation station

BRL: building restriction line

CFR: Code of Federal Regulation

CIP: capital improvement program

DME: distance measuring equipment

DNL: day-night noise level

DWL: runway weight bearing capacity of aircraft with dual-wheel type landing gear

DTWL: runway weight bearing capacity of aircraft with dual-tandem type landing gear

FAA: Federal Aviation Administration

FAR: Federal Aviation Regulation

FBO: fixed base operator

FY: fiscal year

GPS: global positioning system

GS: glide slope

HIRL: high intensity runway edge lighting

IFR: instrument flight rules (FAR Part 91)

ILS: instrument landing system

IM: inner marker

LDA: localizer type directional aid

LDA: landing distance available

LIRL: low intensity runway edge lighting

LMM: compass locator at middle marker

LOM: compass locator at outer marker

LORAN: long range navigation

MALS: medium intensity approach lighting system with indicator lights

MIRL: medium intensity runway edge lighting

MITL: medium intensity taxiway edge lighting

MLS: microwave landing system

MM: middle marker

MOA: military operations area

MSL: mean sea level

NAVAID: navigational aid

NDB: nondirectional radio beacon

NM: nautical mile (6,076.1 feet)

NPES: National Pollutant Discharge Elimination System

NPIAS: National Plan of Integrated Airport Systems

NPRM: notice of proposed rule making

ODALS: omnidirectional approach lighting system

OFA: object free area

OFZ: obstacle free zone

OM: outer marker

PAC: planning advisory committee

PAPI: precision approach path indicator

PFC: porous friction course

PFC: passenger facility charge

PCL: pilot-controlled lighting

PIW public information workshop

PLASI: pulsating visual approach slope indicator

POFA: precision object free area

PVASI: pulsating/steady visual approach slope indicator

PVC: poor visibility and ceiling

RCO: remote communications outlet

RRC: Runway Reference Code

RDC: Runway Design Code

REIL: runway end identification lighting

RNAV: area navigation

RPZ: runway protection zone

RSA: runway safety area

RTR: remote transmitter/receiver

RVR: runway visibility range

RVZ: runway visibility zone

SALS: short approach lighting system

SASP: state aviation system plan

SEL: sound exposure level

SID: standard instrument departure

SM: statute mile (5,280 feet)

SRE: snow removal equipment

SSALF: simplified short approach lighting system with runway alignment indicator lights

STAR: standard terminal arrival route

SWL: runway weight bearing capacity for aircraft with single-wheel tandem type landing gear

TACAN: tactical air navigational aid

TAF: Federal Aviation Administration (FAA) Terminal Area Forecast

TDG: Taxiway Design Group

TLOF: Touchdown and lift-off

TDZ: touchdown zone

TDZE: touchdown zone elevation

TODA: takeoff distance available

TORA: takeoff runway available

TRACON: terminal radar approach control

VASI: visual approach slope indicator

VFR: visual flight rules (FAR Part 91)

VHF: very high frequency

VOR: very high frequency omni-directional range

VORTAC: VOR and TACAN collocated

Appendix B

PAVEMENT CONDITION INVENTORY

ABQ INTERNATIONAL SUNPORT

Sustainable Airport Master Plan

Appendix B
PAVEMENT CONDITION AND HISTORY

The Sunport maintains a pavement management program (PMP) in order monitor the condition of pavements and to plan for repair/replacement in a timely manner. The PMP ensures airport sponsors are in compliance with the requirements of FAA Grant Assurance Number 11, which states that any airport requesting federal funds for pavement improvement projects must have implemented a pavement maintenance management program.

The most recent inspection was in 2015. The inspections are conducted in compliance with FAA Advisory Circular (AC) 150/5380-6, *Guidelines and Procedures for Maintenance of Airport Pavements*. The inspection data is entered into the MicroPAVER software program for analysis. Maintaining a MicroPAVER database ensures that the airport complies with the "record keeping and information retrieval" requirements of the FAA grant assurances.

The MicroPAVER software program calculates a Pavement Condition Index (PCI) for each section of pavement on the airfield (runways, taxiways, and aprons). The program also generates forecasts of pavement condition five and 10 years into the future. The PCI values index ranges from 0 to 100, providing an indication of the overall condition of that section of pavement. Generally, pavement condition becomes critical when the PCI falls below 70 for runways and 55 for taxiways and aprons. The MicroPAVER software also produces detailed reports indicating what on-going routine maintenance should be performed in order to maintain these minimum condition levels. Included in this appendix is the draft PCI report for the Sunport.

At the end of this appendix is a table of historical and current pavement conditions as assembled by the current consulting engineer for the Sunport. This table provides additional detail on each pavement

section. Also documented is a history of pavement sections that have since been closed or removed, most in conjunction with the closure of Runway 17-35 in 2012.

Albuquerque International Sunport
Airfield Pavement Condition Index
Developed from Field Survey performed in 2015

A pavement condition index (PCI) survey was conducted in 2015 to assess the current pavement conditions of all sections of the Sunport airfield pavements. Data was collected from visual field inspection by identifying random representative pavement sample areas on each runway, taxiway and apron and evaluating the type and severity of each distress visible on the pavement surface in the sample areas. Concrete pavement sections had sample areas totaling approximately 50 percent of the overall area of the section and asphalt pavement sections had sample areas totaling approximately 33 percent of the overall area of the section. The sample area data was entered into APWA's MicroPAVER™ software and a PCI was generated based on the distresses recorded in the pavement inspections.

A listing of the overall PCI along with summary descriptions of pavement distresses observed for each airfield runway, taxiway and apron follow. If a pavement facility has both an asphalt pavement section and a concrete pavement section, the description of the distresses are listed in the following narrative. A tabular summary of the resulting PCI for each facility, both in rating classification and numerical PCI score, follows as well as a graphic depiction of the PCI on the Sunport airfield layout.

The PCI rating scale used is as follows:

Rating Classification	**PCI Score**
Good	Above 85
Satisfactory	Between 70 and 85
Fair	Between 55 and 70
Poor	Between 40 and 55
Very Poor	Between 25 and 40
Serious	Between 10 and 25
Failed	Below 10

<u>TAXIWAY A</u>:

Overall Pavement Condition: GOOD

Recently Constructed Section:
The newly built east section (from A4 to the east end) was under construction as the field surveyors were evaluating, so data is limited for this area. The only reoccurring distress for this sub-section was shrinkage cracks most likely caused during the construction process and was minor surface cracking that would not warrant replacing the slab.

Section from A1 to and including A4:
The west sub-section is older pavement and exhibited more distress than the previous sub-section. These distresses included joint spalling/breaking, scaling, and shrinkage. The types of

distress indicate the concrete is affected by repeated loading and freeze/thaw conditions of the environment. Improvements may include patching the affected areas where the distress is most severe. For the areas with low severity, no improvements are warranted.

TAXIWAY B:

Overall Pavement Condition: POOR

Asphalt Section - Poor
This section stretches from Taxiway D east to B6. This pavement was in poor condition due to the extensive bleeding, alligator cracking, and longitudinal/transverse cracking. The major concern with this pavement section is the spalling at the crack edges where there is FOD potential. Options for repair include crack sealant and patching as warranted.

PCC Section: Satisfactory
The PCC section of Taxiway B is small in relation to the asphalt section. It exhibits scaling and joint distress which indicates stress under the freeze/thaw conditions. Similar to Taxiway A, the severely affected areas may require patching; however, there is no indication that this is warranted at this point.

TAXIWAY C:

Overall Pavement Condition: SERIOUS

Asphalt Section: Serious
The asphalt section of Taxiway C is at the southern end of the taxiway and used only to access the remote parking area at the south end of the old Runway 35. The asphalt section is not used for daily operations and the pavement condition does not affect the general needs of the airport. The asphalt condition is categorized as SERIOUS due to the extensive block cracking, raveling/weathering, alligator cracking, and rutting. This is some of the oldest pavement in the airfield (1987) and most of the distresses can be attributed to environmental elements and age. The recommended improvements would be to seal the cracks and patch in areas of need.

Section not included in survey: Taxiway C north of the Terminal Apron, C1, C2, and C3. This section of Taxiway C is closed and is programmed to be removed in the near future.

PCC Section: Satisfactory

The concrete section from Runway 3-21 to the Terminal Apron is categorized as SATISFACTORY based on the PCI data. Some of the major distresses include joint spalling or breaking and shrinkage. Most of the affected areas would not require improvements and should be monitored for further decline and some areas may require patches where the distress is most severe.

TAXIWAY D:

Overall Pavement Condition: FAIR

Taxiway D was evaluated from Runway 3-21 to Taxiway A and the major distresses present were longitudinal/transverse/diagonal cracking, corner distress, and joint distress. Some of these areas had a high FOD potential with large pieces separating from the entire concrete slab. The cracks require sealant where FOD potential is high and patches may be required for areas too severe to seal.

TAXIWAY E:

Overall Pavement Condition: POOR

Asphalt Section: Poor
The asphalt section includes Taxiway E1 and Taxiway E from E5 up to and including E12. The condition of this section is categorized as POOR because of the presence of longitudinal/transverse cracking, alligator cracking, depressions. The depressions, which may be caused by loading, are allowing water to pond on the taxiway. Some depressions noted are 0.75 to 2 inches in depth. Many of the pavement cracks are full depth and wider than crack seal can be effective. Staining on the pavement surface and moisture pumping from some cracks when foot loading is applied indicates that de-lamination is occurring between the lifts of asphalt. The majority of the cracks are sealed. Improvements would include reconstruction of the pavement section due to the advanced distresses evident in the pavement and depth and number of the cracks and pavement depressions observed.

PCC Section: Satisfactory
The concrete section includes Taxiway E from E1 to and including E5. This area was rated SATISFACTORY based on the data collected. Some of the major distresses for this area include joint spall/breaks and scaling. This indicates stress during the freeze/thaw conditions of the environment. Repair of the pavement includes patching where FOD potential is moderate/high and slab replacement if the distress is severe.

TAXIWAY F:

Overall Pavement Condition: SATISFACTORY

The entire length of Taxiway F (the parallel taxiway to Runway 3-21) was evaluated and most of the deficiencies involved the joints of each slab. There was evidence of joint spalling and breaking, joint seal damage or missing joint seal, and some instances of durability cracking. These can be attributed to repeated loads across the joints and the freeze/thaw cycles experienced by the pavement. The recommended improvements would include patching areas of high severity and re-sealing of the joint.

TAXIWAY G:

Overall Pavement Conditions: SATISFACTORY

Taxiway G is the parallel taxiway to Runway 12-30 and the entire length was evaluated. Some of the distresses included joint seal damage and joint spall or breaks. Similar to Taxiway F, these deficiencies can be a result of weather conditions and cycles repeated loads across joints. There were joints noted that the seal was completely missing and moderate FOD potential was evident. Improvements would include re-sealing the joints and patching the joints where needed.

TAXIWAY J:

Overall Pavement Condition: SATISFACTORY

The entire length of Taxiway J was evaluated, from Taxiway C to Taxiway E. The concrete appeared to have only minor distresses such as joint seal damage and shrinkage cracks that could be attributed to the construction conditions when the taxiway was paved.

TAXIWAY K:

Overall Pavement Condition: GOOD

The entire length of Taxiway K along the general aviation apron was evaluated. The major distress along this section was joint damage such as spalls or breaks. These deficiencies can be related to the inability of the pavement to withstand freeze/thaw conditions over time and repeated loads on the joints. Some areas may require removing the affected area and replacing with a patch. However, the distress was low in severity and most areas do not require immediate attention.

RUNWAY 8-26:

Overall Pavement Condition: FAIR

Runway 8-26 experiences the largest amount of traffic of any pavement on the airfield. The more notable distresses exhibited by this pavement are joint spalls/breaks, shrinkage, scaling, and L/T/D cracking. Most of these can be attributed to repeated loads across joints, water blasting, freeze/thaw effects during the life of the pavement and high temperature swings during a portion of the PCCP placement construction (longitudinal cracks). The longitudinal, transverse, or diagonal cracks are the most severe distresses generally along the runway centerline and they have potential for FOD and excessive surface voids. In areas along the centerline, the joint seal has been damaged, apparently by water blast during rubber and paint removal operations and should be replaced. It is recommended to patch the broken edges where spalling is severe and replace the slabs with moderate/severe L/T/D cracking (76 slabs affected by longitudinal or D-cracking).

As noted, the damaged joint seal and damage to the pavement surface (scaling) is apparently a result of the rubber and paint removal machine. This machine water blasts the pavement to remove rubber and paint build-up and it the high pressure water blast has damaged the top of the concrete, exposing aggregate. The repeated application of pavement markings result in paint build up that eventually spalls and causes a FOD issue. The rubber build up must be removed periodically to maintain pavement surface friction for adequate aircraft braking action. The recommended improvements include patching where warranted and sealing cracks that have potential to expand and to investigate use of lower water pressure for rubber and paint removal.

RUNWAY 3-21:

Overall Pavement Condition: SATISFACTORY

Runway 3-21 was evaluated for the full length of the runway, including the intersection of 3-21 and 12-30. The intersection had a lower PCI rating than the surrounding runways as expected with the number of operations from two runways at roughly 90 degree alignments (Intersection pavement condition = FAIR). The two major distresses on 3-21 include scaling and shrinkage cracks. These may be a result of water blasting for rubber and paint removal and environmental conditions both before and after construction.

As noted, the damaged joint seal and damage to the pavement surface (scaling) is apparently a result of the rubber and paint removal machine. This machine water blasts the pavement to remove rubber and paint build-up and it the high pressure water blast has damaged the top of the concrete, exposing aggregate. The repeated application of pavement markings result in paint build up that eventually spalls and causes a FOD issue. The rubber build up must be removed periodically to maintain pavement surface friction for adequate aircraft braking action. The recommended improvements include patching where warranted and sealing cracks that have potential to expand and to investigate use of lower water pressure for rubber and paint removal.

RUNWAY 12-30:

Overall Pavement Condition: SATISFACTORY

Runway 12-30 was evaluated for the full length, excluding the pavement in the intersection of 3-21 and 12-30. The major distresses found were joint spalls/breaks and shrinkage. The shrinkage can be attributed to the environmental conditions during construction and the joint breaks and spalls can be attributed to repeated loads across joints and freeze/thaw weather conditions and the striping removal machine. Many of the joint cracks and spalls were small enough to not warrant any improvements, but some areas may require patching as repeated loads wear away the concrete.

CARGO APRON:

Overall Pavement Condition: FAIR

The Cargo Apron holds large cargo aircraft unique to this apron and not seen at the other aprons at the Sunport, but it does not see the number of operations as the Terminal Apron or the General Aviation Apron. All areas of the apron were evaluated and distresses such as joint spall/breaks, joint seal damage, shrinkage, and L/T/D cracking were evident. The recommended improvements include replacing all the joint seal damage as that was the most frequent distress of all of them, patching where necessary for the joint spalls and breaks, and replacing the slabs with the moderate/severe L/T/D cracks.

TERMINAL APRON

Overall Pavement Condition: SATISFACTORY

NE Section: Satisfactory
This section covers the northeast quadrant of the terminal apron. The major distress shown in this section is shrinkage and joint breaks/spalling. These deficiencies are lost likely a result of repeated loads across joints and environmental conditions during construction. This area is subject to repeated heavy loads that may contribute to the joint distress. The recommended improvements are patching the areas of joint breaks where necessary and the shrinkage cracks do not warrant any improvements at this time.

NW Section: Satisfactory
This section cover the northwest quadrant of the terminal apron, excluding the area of old pavement in the far NW corner of the apron that was not reconstructed in the terminal apron improvements project in 2006-2008. Similar to the NE section, joint spalls/breaks and shrinkage; however, there are more shrinkage cracks in this section. The recommended improvements include patching the areas of joint breaks where necessary in the newer sections and the shrinkage cracks do not warrant any improvements at this time.

SE Section: Satisfactory
This section covers the southeast quadrant of the terminal apron. Similar to the previous sections, this area has shrinkage and joint distress. However, this area also exhibits scaling, which could be a result of the freeze/thaw conditions of the weather. The recommended improvements are patching the areas of joint breaks where necessary and the shrinkage cracks and scaling do not warrant any improvements at this time.

SW Section: Satisfactory
This section covers the southwest quadrant of the terminal apron, excluding the area for fuel truck parking. This quadrant has a higher PCI than the other quadrants, but also exhibits the same types of distress. The recommended improvements are patching the areas of joint breaks where necessary and the shrinkage cracks and scaling do not warrant any improvements at this time.

Far NW Corner Section and Commuter Ramps: Serious
These sections are the old pavement that was excluded from the NW Section survey and the Commuter Ramp on the east side of the Terminal. The pavement condition of both areas is categorized as SERIOUS and warrants replacement. Some of the major distresses are L/T/D cracks, scaling, joint distress, and corner distress caused primarily by alkali-silica reaction (ASR) in the concrete. There is a project currently in construction to replace both of these sections of pavement.

Bag Make Up Area (West side of Terminal): Serious
This section is old pavement where bag carts enter the apron from the bag make up area located in the west side of the Terminal. The pavement in this section has similar types of distress as the NW Corner Section. This section is also under construction to replace the pavement.

Fuel Truck Parking Section: Very Poor
This is the section that was excluded from the SW Section. The major distresses in the pavement are L/T/D cracks, scaling, and joint spalls or breaks caused primarily by alkali-silica reaction in the concrete. Patching will be required for the areas where the joint distress and scaling are severe and slab replacement will be required for areas with the moderate/severe L/T/D cracks.

Under Terminal Building Section: Poor
This pavement is under the terminal building where ground vehicles operate and no aircraft traffic operate. This area is used by service vehicles and airline employees. The major issues with this pavement include joint distress, L/T/D cracking, and scaling caused primarily by ASR in the concrete. This pavement is consistently in the shade and could be more susceptible to moisture aggravation of the ASR. Improvements to this area would include patching small areas of severe distress and slab replacement for areas with moderate/severe cracking.

GENERAL AVIATION APRON

Overall Pavement Condition: GOOD

Asphalt Section (Adjacent to Sunport IV Hangar): Satisfactory
This section was recently reconstructed and has a pavement condition categorized as GOOD. The only visual deficiencies are some minor raveling where some segregation occurred and where the asphalt meets the concrete. There are no recommended improvements at this time. Monitor the joints to ensure they are sealed.

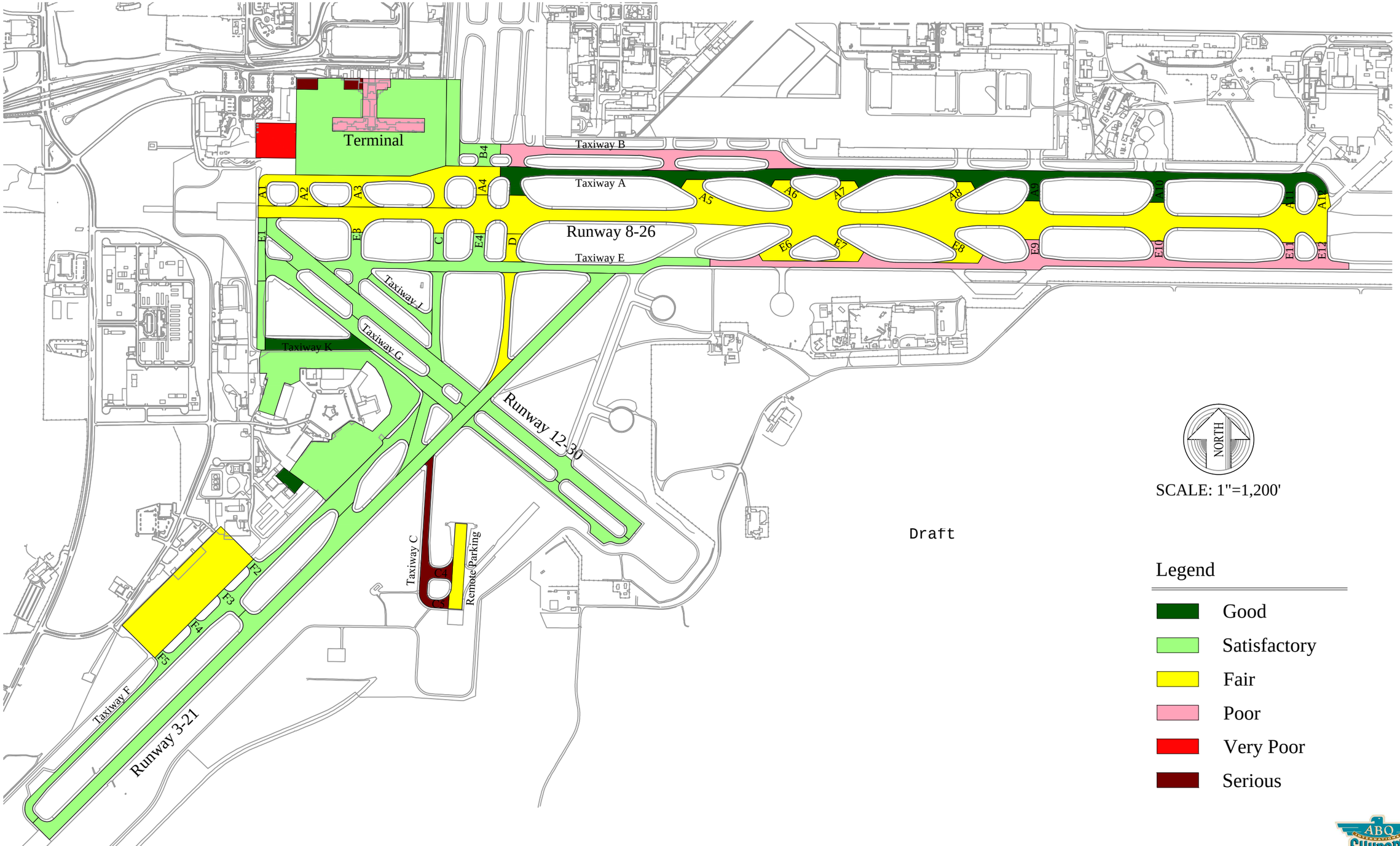
PCC Section: Satisfactory
This section encompasses the entire general aviation apron for the exception of the small asphalt section listed above. The only major distress for the entire area is joint spalls or breaks. This could be a result of repeated loads and unexpected traffic patterns on the pavement. The recommended improvements for this section would include patching in the areas that warrant it and repair of the joint seal. All other distresses should be monitored for increases in severity.

PAVEMENT CONDITION INDEX SURVEY

Albuquerque International Sunport

August, 2015

NAME	SECTION	PCI (per section)		PCI (totals)	
TAXIWAYS					
A	New Concrete	90.2	Good	87.2	Good
	Along Terminal Apron	67.7	Fair		
B	Asphalt	53.6	Poor	53.6	Poor
	Concrete	75.0	Satisfactory		
C	from 3-21 to C5 (Asphalt)	22.3	Serious	53.1	Poor
	Concrete	67.7	Satisfactory		
D	all	69.7	Fair	69.7	Fair
E	Asphalt	40.3	Poor	50.6	Poor
	Concrete	75.4	Satisfactory		
F	all	72.6	Satisfactory	72.6	Satisfactory
G	all	84.3	Satisfactory	84.3	Satisfactory
J	all	85.1	Satisfactory	85.1	Satisfactory
K	all	87.2	Good	87.2	Good
RUNWAYS					
8 26	all	61.7	Fair	61.7	Fair
3 21	all	85.2	Satisfactory	84.2	Satisfactory
12 30	all	82.4	Satisfactory	82.4	Satisfactory
APRONS					
CARGO	all	68.4	Fair	68.4	Fair
TERMINAL	Old pvmt (NW corner)	20.1	Serious	70.3	Satisfactory
	Old pvmt (police parking)	14.0	Serious		
	Fuel Truck parking area	27.7	Very Poor		
	Concrete under Terminal Building	52.0	Poor		
	NE Apron	83.3	Satisfactory		
	NW Apron	78.3	Satisfactory		
	SE Apron	77.4	Satisfactory		
	SW Apron	82.0	Satisfactory		
GEN AVIATION	Eclipse	83.3	Satisfactory	84.9	Satisfactory
	Atlantic	80.4	Satisfactory		
	Cutter	84.1	Satisfactory		
	7 Bar (asphalt)	91.2	Good		
REMOTE PARKING					
17 35	all	68.3	Fair	68.3	Fair



Pavement Condition Index Survey Map

Airport Pavement Characteristic Data
Albuquerque International Sunport

Pavement Area	Surface Material	Strength Rating	Condition	Year Constructe	Improvement History
Runway 8-26	Concrete	210,000 D 360,000 DT 720,000 DDT	Fair	1995	Reconstructed 1995; slabs replaced in 1999, 2012, 2015
Runway 17-35					Closed in 2012
Runway 3-21	Concrete	210,000 D 360,000 DT 720,000 DDT	Good	1994	Reconstructed/Lengthened 1994
Runway 12-30	Concrete	65,000 S 120,000 D 155,000 ST	Excellent	1999	Reconstructed/Lengthened 1999
Taxiway A	Concrete - East of TW A4	210,000 D	Excellent	2014	Reconstructed east of TW A4 portion 2014-2015
	Concrete - West of TW A4	360,000 DT	Good	2004	Reconstructed portion from TW D to Term Apron 2004
			Good	1996	Reconstructed west portion 1996 (8-26)
Taxiway A-1	Concrete	210,000 D 360,000 DT	Good	1996	Reconstructed 1996 (8-26)
Taxiway A-2	Concrete	210,000 D 360,000 DT	Good	1996	Reconstructed 1996 (8-26)
Taxiway A-3	Concrete	210,000 D 360,000 DT	Good	1996	Reconstructed 1996 (8-26)
Taxiway A-4	Concrete	210,000 D 360,000 DT	Good	1996	Reconstructed 1996 (8-26) Previously part of RW 17-35 (became taxiway 2013)
Taxiway A-5	Concrete	210,000 D 360,000 DT	Excellent	2015	Reconstructed concrete 2015 (TW A)
			Good	1996	Reconstructed concrete portion 1996 (8-26)
Taxiway A-6	Concrete	210,000 D 360,000 DT	Excellent	2015	Reconstructed concrete 2015 (TW A)
			Good	1996	Reconstructed concrete portion 1996 (8-26)
Taxiway A-7	Concrete	210,000 D 360,000 DT	Excellent	2015	Reconstructed concrete 2015 (TW A)
			Good	1996	Reconstructed concrete portion 1996 (8-26)
Taxiway A-8	Concrete	210,000 D 360,000 DT	Excellent	2015	Reconstructed concrete 2015 (T/W A)
			Good	1996	Reconstructed concrete portion 1996 (8-26)
Taxiway A-9	Concrete	210,000 D 360,000 DT	Excellent	2015	Reconstructed concrete 2015 (TW A)
			Good	1996	Reconstructed concrete portion 1996 (8-26)
Taxiway A-10	Concrete	210,000 D 360,000 DT	Good	1996	Reconstructed concrete 2015 (TW A)
Taxiway A-11	Concrete	210,000 D 360,000 DT	Excellent	2015	Reconstructed concrete 2015 (T/W A)
			Good	1996	Reconstructed concrete portion 1996 (8-26)
Taxiway A-12	Concrete	210,000 D 360,000 DT	Excellent	1993/1996	Reconstructed concrete 2015 (TW A)
			Good		Reconstructed concrete portion 1996 (8-26)
Taxiway B	Concrete	210,000 D	Good	2004	Reconstructed portion from TW D to Terminal Apron 2004
	Asphalt	360,000 DT	Fair	1993	Constructed 1993 (TW A)
Taxiway B-5	Asphalt	210,000 D 360,000 DT	Good	1993	Constructed 1993 (T/W A)
Taxiway C	Asphalt	Limited	Poor	1985	Asphalt portion reconstructed 1985 South of RW 3-21 (RW 17-35)
	Concrete	210,000 D 360,000 DT	Good	1994	Concrete portion constructed 1994 (3-21)
Taxiway C-1					Closed in 2012
Taxiway C-2					Closed in 2012
Taxiway C-3					Closed in 2012
Taxiway C-4					Closed in 2012
Taxiway C-5	Asphalt	210,000 D 360,000 DT	Fair	1985	Reconstructed 1985 (17-35)
Taxiway D	Asphalt	210,000 D	Poor	1993	Portion north of TW A constructed in 1993 (TW A)
	Concrete	360,000 DT	Good	1994/1996	Concrete portion constructed 1994 and 1996 (3-21, 8-26)
Taxiway D-1					Closed in 2012
Taxiway D-2					Closed in 2012
Taxiway D-3					Closed in 2012
Taxiway E	Asphalt	210,000 D	Poor	1991	Asphalt reconstructed and lengthened 1991
	Concrete	360,000 DT	Excellent	1999	Concrete west of TW E5 reconstructed 1999 (12-30) and 2007
Taxiway E-1	Asphalt	210,000 D	Fair	1991	Asphalt reconstructed and lengthened 1991
	Concrete	360,000 DT	Good	1999	Concrete north of TW E reconstructed 1999 (12-30)
Taxiway E-3	Concrete	210,000 D 360,000 DT	Good	1996	Reconstructed 1996 (8-26)
Taxiway E 5					Closed in 2014
Taxiway E-6	Asphalt	210,000 D	Fair	1991	Reconstructed asphalt 1993 (TW E)
	Concrete	360,000 DT	Good	1996	Reconstructed concrete portion 1996 (8-26)
Taxiway E-7	Asphalt	210,000 D	Fair	1991	Reconstructed asphalt 1993 (TW E)
	Concrete	360,000 DT	Good	1996	Reconstructed concrete portion 1996 (8-26)
Taxiway E-8	Asphalt	210,000 D	Fair	1991	Reconstructed asphalt 1993 (TW E)
	Concrete	360,000 DT	Good	1996	Reconstructed concrete portion 1996 (8-26)
Taxiway E-9	Asphalt	210,000 D	Fair	1991	Reconstructed asphalt 1993 (TW E)
	Concrete	360,000 DT	Good	1996	Reconstructed concrete portion 1996 (8-26)
Taxiway E-10	Asphalt	210,000 D	Fair	1996	Constructed concrete portion 1996 (8-26)
	Concrete	360,000 DT	Good		
Taxiway E-11	Asphalt	210,000 D	Poor	1991	Reconstructed asphalt 1993 (TW E)
	Concrete	360,000 DT	Good	1996	Reconstructed concrete portion 1996 (8-26)
Taxiway E-12	Asphalt	210,000 D	Poor	1991	Reconstructed asphalt 1993 (TW E)
	Concrete	360,000 DT	Good	1996	Reconstructed concrete portion 1996 (8-26)

Taxiway F	Concrete	210,000 D 360,000 DT	Good	1994	Reconstructed/Lengthened 1994 (3-21)
Taxiway F-1	Concrete	210,000 D 360,000 DT	Good	1994	Constructed 1994 (3-21)
Taxiway F-2	Concrete	210,000 D 360,000 DT	Good	1994	Constructed 1994 (3-21)
Taxiway F-3	Concrete	210,000 D 360,000 DT	Good	1994	Constructed 1994 (3-21)
Taxiway F-4	Concrete	210,000 D 360,000 DT	Good	1994	Constructed 1994 (3-21)
Taxiway F-5	Concrete	210,000 D 360,000 DT	Good	1996	Constructed 1996 (8-26)
Taxiway F-6	Concrete	210,000 D 360,000 DT	Good	1994	Constructed 1994 (3-21)
Taxiway G	Concrete	65,000 S 120,000 D 155,000 ST (SE of TW G1) 210,000 D 360,000 DT (NW of TW G1)	Good	1994	Reconstructed NW of 3-21 1994 (3-21)
			Excellent	1999	Reconstructed SE of 3-21 1999 (12-30)
Taxiway G-1	Concrete	210,000 D 360,000 DT	Excellent	1999	Relocated 1999 (12-30)
Taxiway G-2	Concrete	65,000 S 120,000 D 155,000 ST	Excellent	1999	Constructed 1999 (was connector to H, 12-30)
Taxiway G-3	Concrete	65,000 S 120,000 D 155,000 ST	Excellent	1999	Constructed 1999 (12-30)
Taxiway H	Asphalt				Closed 1994 (Open to Air Force) Last rehab was 1958.
Taxiway J	Concrete	210,000 D 360,000 DT	Good	1996	Constructed 1996 (8-26)
Taxiway K	Concrete	210,000 D 360,000 DT	Good	1995	Constructed 1995 (3-21)
Taxiway M-1	Asphalt		Fair	<1960/1993	<1960. Portion reconstructed 1993 (TW A)
Taxiway M-2	Asphalt	210,000 D 360,000 DT	Fair	1993	Constructed 1993 (TW A)
Taxiway M-3	Asphalt	210,000 D 360,000 DT	Fair	1993	Constructed 1993 (TW A)
Taxiway M-4	Asphalt	210,000 D 360,000 DT	Fair	1993	Constructed 1993 (TW A)
Taxiway M-5	Asphalt	210,000 D 360,000 DT	Fair	1993	Constructed 1993 (T/W A)
Taxiway M-6	Asphalt	210,000 D 360,000 DT	Fair	1993	Constructed 1993 (TW A)
Taxiway M-7	Asphalt	210,000 D 360,000 DT	Fair	1993	Constructed 1993 (TW A)
Taxiway M-8	Asphalt	210,000 D 360,000 DT	Fair	1991	Constructed 1991 (TW E)
Terminal Apron	Concrete	210,000 D 360,000 DT	Excellent	1986 1996	Reconstructed 2006-2008
Commuter Apron	Concrete	210,000 D 360,000 DT	Poor	1986	Constructed w/Terminal Renovations 1986
NW Apron	Concrete	210,000 D 360,000 DT	Poor	1986	Constructed w/Terminal Renovations 1986
West Apron	Concrete	210,000 D 360,000 DT	Fair	1984	Constructed 1984
Air Cargo Freight Apron	Concrete	210,000 D 360,000 DT	Good Good	1989 1996	Constructed 1989 (3-21) Extended 1996 (8-26)
General Aviation Apron (Cutter, Atlantic)	Concrete	Varies	Excellent	2013	Reconstruced 2013 (GA Apron Reconstruction)
City Hangar Apron (west of SPIV)	Asphalt	Varies	Excellent	2015	Reconstructed 2015 (SP IV Hangar Renovations
NDI Validation Center Apron	Asphalt	Varies	Poor	1971	Constructed approximately 1971
Sunport IV Apron	Asphalt	Varies	Excellent	2015	Reconstructed 2015 (SP IV Hangar Renovations)
T-Hangar Apron/Taxilanes	Asphalt	Varies	Poor	1984	Constructed 1984

S: Single wheel type landing gear (most general aviation aircraft)
D: Dual wheel type landing gear (B737, A320)
ST: Two single wheels in tandem type landing gear (C130)
DT: Two dual wheels in tandem type landing gear (B707)
DDT: Two dual wheels in tandem/two dual wheels in double tandem type landing gear (B747)

Source: Molzen-Corbin & Associates (2015)

Appendix C

FORECAST APPROVAL LETTER

ABQ INTERNATIONAL SUNPORT

Sustainable Airport Master Plan

U.S. Department
of Transportation
Federal Aviation Administration

Federal Aviation Administration
Southwest Region
Louisiana/New Mexico Airports
Development Office

10101 Hillwood Parkway
Fort Worth, Texas 76177

November 18, 2015

Mr. Jim Hinde, Director
Albuquerque International Sunport / Double Eagle II Airport
2200 Sunport Blvd
Albuquerque, NM 87119

RE: Albuquerque International Sunport (ABQ) Aviation Forecast Approval

Dear Mr. Hinde:

The FAA approves your aviation forecast as prepared and submitted to the FAA by Coffman Associates on May 4, 2015. The same data is reflected in Chapter 2, Aviation Demand Forecasts, of your ongoing Airport Master Plan (AMP). We find that the rationale used to develop your forecast is both acceptable and consistent with our guidelines.

Should you have any questions, please contact me at (817) 222-5647.

Sincerely,

Andy Velayos
Lead Planner
Louisiana/New Mexico Airports Development Office

Appendix D

HOLD LINE WHITE PAPER

ABQ INTERNATIONAL SUNPORT

Sustainable Airport Master Plan

ALBUQUERQUE INTERNATIONAL SUNPORT
AIRCRAFT HOLD LINE LOCATION ANALYSIS
WHITE PAPER – JUNE 24, 2016

HOLD LINE LOCATION ISSUE

The location of many of the taxiway hold lines at the Sunport do not meet current FAA design standards. In 2004, the FAA issued a Modification of Standards (MOD) – *To Leave Mandatory Hold Positions at their Current Locations at the Albuquerque International Sunport*, *Albuquerque, NM*. The existing MOD for the hold lines at the Sunport (See **Attachment 1**) states that moving them from their current location of 250 feet for Runways 8-26 and 3-21, "could result in insufficient ramp separation, and capacity issues".

In 2015, the Sunport and the FAA initiated an Airport Master Plan update. It is typical during such a planning efforts to review existing MOD's. The following actions may result:

1) Rescind the MOD (must meet the standard);
2) Issue a new MOD which reaffirms the intent of the previous MOD;
3) Issue a new MOD with revisions.

CURRENT CONDITION

Runway 8-26: All hold lines are located at least 250 feet from the runway centerline. This distance does vary depending on the taxiways due to the angle of the taxiway, guidance sign placement, and other factors.

Runway 3-21: All hold lines are located at least 250 feet from the runway centerline. This distance does vary depending on the taxiways due to the angle of the taxiway, guidance sign placement, and other factors.

Runway 12-30: All hold lines are located at least 200 feet from the runway centerline. This distance does vary depending on the taxiways due to the angle of the taxiway, guidance sign placement, and other factors.

CURRENT DESIGN STANDARDS

According to FAA AC 150/5300-13A*, Airport Design*, the hold line separation distance to the runway centerline must be increased based on the elevation of the airport, the Runway Design Code (RDC) of the runway, and the instrument approach visibility minimums. The rows in **BOLD** represent the hold line separation design standard as it applies today (6.24.16) based on the

current Airport Layout Plan (ALP). **Table WP1** shows the current standard for hold line separation distance as well as others for comparison purposes.

TABLE WP1
Hold Line Location Design Standard
Albuquerque International Sunport

Sunport Elevation: 5,355' MSL

Airport Reference Code	Visibility Minimum	Standard Hold Line Separation from Runway at Sea Level	Hold Line Separation with Elevation Adjustment[1]
Runway 8-26 (ARC D-V)			
C/D/E-V	**Lower than ¾-mile**	**280'**	**334'**
C/D/E-V	¾-mile and above	250'	304'
C/D/E-IV	Lower than ¾-mile	250'	304'
C/D/E-IV	¾-mile and above	250'	304'
C/D/E-III	Lower than ¾-mile	250'	304'
C/D/E-III	¾-mile and above	250'	304'
Runway 3-21 (ARC D-IV)			
C/D/E-IV	**Lower than ¾-mile**	**250'**	**304'**
C/D/E-IV	¾-mile and above	250'	304'
Runway 12-30 (ARC B-III)			
B-III	**Visual to ¾-mile**	**200'**	**203'**
B-III	Lower than ¾-mile	250'	253'

[1]C/D/E - III/IV/V/VI (and A/B-IV) require increasing the separation distance 1 foot for every 100 feet above sea level.
[1]A/B-III require increasing the separation distance 1 foot for every 100 feet above 5,100 feet.

Runway 8-26 is currently planned to an RDC of D-V. It has an instrument approach with visibility minimums lower than ¾-miles. This RDC requires an elevation adjustment of 1-foot of separation for every 100 feet in elevation or an additional 54 feet in separation distance. Thus the hold line separation standard for Runway 8-26 is a distance of 334 feet from the runway centerline.

Runway 3-21 is currently planned to an RDC of D-IV. It has an instrument approach with visibility minimums lower than ¾-miles. This RDC requires an elevation adjustment of 1-foot for every 100 feet in elevation or an additional 54 feet in separation distance. Thus the hold line separation standard for Runway 3-21 is a distance of 304 feet from the runway centerline.

The baseline hold line separation standard at sea level is different for RDC D-V and D-IV. The D-V sea level hold line separation is 280 feet and for D-IV it is 250 feet. Both are then increased by 54 feet to account for the elevation at the Sunport.

Runway 12-30 is currently planned to an RDC of B-III. It is a visual runway and does not have instrument approaches at this time. This RDC requires an elevation adjustment of 1-foot for every 100 feet in elevation above 5,100 feet or an additional three (3) feet in separation distance. Thus the hold line separation standard for Runway 12-30 is a distance of 203 feet from the runway centerline.

HOLD LINE LOCATION ANALYSIS

A number of factors will come into play when determining the optimal location for hold lines. The first and foremost is the applicable design standard. When feasible, the hold lines should be located at the standard separation distance to the runway centerline.

The following principals may impact implementation of standard hold lines:

- Limited runway to parallel taxiway separation which could result in holding aircraft blocking the parallel taxiway. Optimally, the holding aircraft will be outside the taxiway object free area (TOFA) of the parallel taxiway, thus permitting another aircraft to pass on the parallel taxiway.

- FAA AC 150/5300-13A, *Airport Design*, (para. 407.a) states that right-angle intersections are the standard for all runway/taxiway intersections (exceptions are high-speed exits and taxiways parallel to crossing runways) because they provide the "best visual perspective to a pilot approaching an intersection with the runway to observe aircraft in both the left and right direction. Right-angled intersections also provide the optimal orientation of the runway holding position signs so they are visible to pilots."

Each of the taxiways providing access to Runways 8-26 and 3-21 was analyzed to determine if a holding aircraft would violate either of the above listed principals if a standard hold line were in place.

Runway 8-26 D-V Hold Lines – Taxiway A

The planned RDC for Runway 8-26, D-V, matches the current ALP for the Sunport. At sea level, hold lines are to be at a separation distance of 280 feet from the runway centerline. At the Sunport, with a field elevation of 5,355 feet MSL, an additional 54 feet would be added to this distance. Therefore, to meet the design standard, all taxiways hold lines associated with Runway 8-26 should be at a minimum separation distance of 334-feet from the runway centerline.

Parallel Taxiway A has three distinct segments. The western portion, adjacent the terminal apron, is 450 feet from the runway, centerline to centerline. The middle portion is 550 feet from the runway and the eastern portion is 600 feet from the runway. A standard hold line

located 334 feet from the runway centerline would be in the Taxiway A OFA by a distance of 44 feet. The middle portion of the taxiway would have 56 feet of clearance and the eastern portion of Taxiway A would have 106 feet of clearance.

Both a 138-foot long 737-900 (D-III) and a 232-foot long 747-400 (D-V) aircraft were analyzed for their potential penetration of the Taxiway A OFA while holding at a hold line located 334 feet from the runway centerline. Both aircraft would penetrate the Taxiway A OFA at all taxiway connections to the runway.

A second analysis was conducted to determine if the selected aircraft could turn from parallel Taxiway A toward the runway and be fully perpendicular to the runway when holding at the 334-foot hold line. Taking into consideration allowable turning radiuses, it was determined neither the 737 nor the 747 could line up perpendicular to the runway on taxiways A1, A2, A3, or C, those closest to the terminal area. The 737 could be perpendicular to the runway on taxiways A4 and D but not the 747. Both aircraft could be perpendicular to the runway on the eastern end taxiways. Of course neither could be perpendicular on the high-speed taxiways because they are at an angle already.

Table WP2 presents this analysis.

Runway 8-26 D-V Hold Lines – Taxiway E

Parallel Taxiway E has three distinct segments. The western portion is 675 feet from the runway. The middle portion is 600 feet from the runway and the eastern portion is 550 feet from the runway centerline. A standard hold line located 334 feet from the runway centerline would be outside the Taxiway E OFA at all three segments.

Both a 138-foot long 737-900 (D-III) and a 232-foot long 747-400 (D-V) aircraft were analyzed for their potential penetration of the Taxiway E OFA while holding at a hold line located 334 feet from the runway centerline. The 737 would penetrate the Taxiway E OFA at the middle and eastern connecting taxiways. It would not penetrate the OFA on the western end (Taxiways E1, E3, C, E4, D). The 747 would penetrate the OFA at all taxiway connections.

The 737 is able to line up perpendicular to the runway at all the taxiway connections along Taxiway E. The 747 can hold perpendicular to the runway on all taxiway E connections except for the eastern ones (E10, E11, E12).

Table WP3 presents this analysis.

Runway 8-26 D-IV Hold Lines – Taxiway A

While the Sunport has been planned to D-V design standards in the past, the number of operations by these very large transport aircraft (e.g. 747) are less than 500 per year, the

TABLE WP2
D-V Hold Line Analysis - Taxiway A

Taxiway	Runway Centerline to Twy A Centerline	Distance from Standard Hold Line (334') to Taxiway Centerline	Distance from Hold Line to Parallel Taxiway TOFA (D-V: 320' centered)	Depth of TOFA penetration of a 737-900 (138 feet long) at standard hold position.	Able to line up aircraft perpindicular to runway at hold line (Yes/No)	Depth of TOFA penetration of a 747-400 (232 feet long) at standard hold position.	Able to line up aircraft perpindicular to runway at hold line (Yes/No)
A1	450	116	-44	-182	No	-276	No
A2	450	116	-44	-182	No	-276	No
A3	450	116	-44	-182	No	-276	No
C	450	116	-44	-182	No	-276	No
A4	550	216	56	-82	Yes	-176	No
D	550	216	56	-82	Yes	-176	No
A5	550	216	56	-82	NA	-176	NA
A6	550	216	56	-82	NA	-176	NA
A7	600	266	106	-32	NA	-126	NA
A8	600	266	106	-32	NA	-126	NA
A9	600	266	106	-32	Yes	-126	Yes
A10	600	266	106	-32	Yes	-126	Yes
A11	600	266	106	-32	Yes	-126	Yes
A12	600	266	106	-32	Yes	-126	Yes

TABLE WP3
D-V Hold Line Analysis - Taxiway E

Taxiway	Runway Centerline to Twy E Centerline	Distance from Standard Hold Line (334') to Taxiway Centerline	Distance from Hold Line to Parallel Taxiway TOFA (D-V: 320' centered)	Depth of TOFA penetration of a 737-900 (138 feet long) at standard hold position.	Able to line up aircraft perpindicular to runway at hold line (Yes/No)	Depth of TOFA penetration of a 747-400 (232 feet long) at standard hold position.	Able to line up aircraft perpindicular to runway at hold line (Yes/No)
E1	675	341	181	43	Yes	-51	Yes
E3	675	341	181	43	Yes	-51	Yes
C	675	341	181	43	Yes	-51	Yes
E4	675	341	181	43	Yes	-51	Yes
D	675	341	181	43	Yes	-51	Yes
E6	600	266	106	-32	NA	-126	NA
E7	600	266	106	-32	NA	-126	NA
E8	600	266	106	-32	NA	-126	NA
E9	600	266	106	-32	Yes	-126	Yes
E10	550	216	56	-82	Yes	-176	No
E11	550	216	56	-82	Yes	-176	No
E12	550	216	56	-82	Yes	-176	No

threshold of significance for the FAA. Therefore, changing the airport reference code to D-IV (e.g. 757) was considered. Making this change has an impact on several design standards for an airport, the most applicable of which is that the baseline hold line separation standard is 250 feet and not 280 feet as is applicable to D-V. With the increase for elevation remains 1-foot for every 100-feet in elevation or 54 feet, thus the standard hold line separation distance to the runway centerline is 304 feet for Runway 8-26.

On the north side of Runway 8-26, the 304-foot hold line would be outside the Taxiway A OFA. A holding 737 would not penetrate the Taxiway A OFA on the eastern connecting taxiways (A7-A12), but it would penetrate the when on the western connecting taxiways (A1-A6). A D-IV aircraft (Boeing 757) was used for additional analysis. A holding 757 would penetrate the Taxiway A OFA at all taxiway connectors on the north side of Runway 8-26.

Both the 737 and 757 would be unable to line up perpendicular to the runway at the 304-foot hold line on Taxiways A1, A2, A3, and C. Both would be able to line up perpendicular to the runway on the remaining Taxiway A connectors.

Table WP4 presents this analysis.

Runway 8-26 D-IV Hold Lines – Taxiway E

On the south side of Runway 8-26, both the 737 and757 would be clear of the Taxiway E OFA on all connecting taxiways except Taxiway E10, E11, and E12.

The 737 can line up perpendicular to Runway 8-26 on all Taxiway E connecting taxiways. The 757 can line up perpendicular to the runway on all connecting taxiways except A10, A11, and A12.

Table WP5 presents this analysis.

Runway 3-21 D-IV Hold Lines – Taxiway F

The planned RDC for Runway 3-21 is D-IV which is the same as the current ALP for the Sunport. At sea level, hold lines are to be at a separation distance of 250 feet from the runway centerline. At the Sunport, with a field elevation of 5,355 feet MSL, an additional 54 feet would be added to this distance. Therefore, to meet the design standard, all taxiways hold lines associated with Runway 3-21 should be at a separation distance of 304-feet from the runway centerline.

Parallel Taxiway F is 450 feet from Runway 3-21, centerline to centerline. A hold line situated 304 feet from the runway centerline would be outside of the Taxiway F OFA but both the 737

TABLE WP4
D-IV Hold Line Analysis - Taxiway A

Taxiway	Runway Centerline to Twy A Centerline	Distance from Standard Hold Line (304') to Taxiway Centerline	Distance from Hold Line to Parallel Taxiway TOFA (D-IV: 259' centered)	Depth of TOFA penetration of a 737-900 (138 feet long) at standard hold position.	Able to line up aircraft perpindicular to runway at hold line (Yes/No)	Depth of TOFA penetration of a 757-300 (182 feet long) at standard hold position.	Able to line up aircraft perpindicular to runway at hold line (Yes/No)
A1	450	146	16.5	-121.5	No	-165.5	No
A2	450	146	16.5	-121.5	No	-165.5	No
A3	450	146	16.5	-121.5	No	-165.5	No
C	450	146	16.5	-121.5	No	-165.5	No
A4	550	246	116.5	-21.5	Yes	-65.5	Yes
D	550	246	116.5	-21.5	Yes	-65.5	Yes
A5	550	246	116.5	-21.5	NA	-65.5	NA
A6	550	246	116.5	-21.5	NA	-65.5	NA
A7	600	296	166.5	28.5	NA	-15.5	NA
A8	600	296	166.5	28.5	NA	-15.5	NA
A9	600	296	166.5	28.5	Yes	-15.5	Yes
A10	600	296	166.5	28.5	Yes	-15.5	Yes
A11	600	296	166.5	28.5	Yes	-15.5	Yes
A12	600	296	166.5	28.5	Yes	-15.5	Yes

TABLE WP5
D-IV Hold Line Analysis - Taxiway E

Taxiway	Runway Centerline to Twy E Centerline	Distance from Standard Hold Line (304') to Taxiway Centerline	Distance from Hold Line to Parallel Taxiway TOFA (D-IV: 259' centered)	Depth of TOFA penetration of a 737-900 (138 feet long) at standard hold position.	Able to line up aircraft perpindicular to runway at hold line (Yes/No)	Depth of TOFA penetration of a 757-300 (182 feet long) at standard hold position.	Able to line up aircraft perpindicular to runway at hold line (Yes/No)
E1	675	371	241.5	103.5	Yes	59.5	Yes
E3	675	371	241.5	103.5	Yes	59.5	Yes
C	675	371	241.5	103.5	Yes	59.5	Yes
E4	675	371	241.5	103.5	Yes	59.5	Yes
D	675	371	241.5	103.5	Yes	59.5	Yes
E6	600	296	166.5	28.5	NA	-15.5	NA
E7	600	296	166.5	28.5	NA	-15.5	NA
E8	600	296	166.5	28.5	NA	-15.5	NA
E9	600	296	166.5	28.5	Yes	-15.5	Yes
E10	550	246	116.5	-21.5	Yes	-65.5	No
E11	550	246	116.5	-21.5	Yes	-65.5	No
E12	550	246	116.5	-21.5	Yes	-65.5	No

and the 757 would penetrate the OFA when holding. Neither of the aircraft would line up at a 304-foot hold line and be perpendicular to the runway.

Table WP6 presents this analysis.

Runway 12-30 B-III Hold Lines – Taxiway G

The design standard for B-III runways, such as Runway 12-30, is for hold lines to be at a separation distance of 200 feet at sea level. At elevation, the hold line separation distance is increased one-foot for every 100 feet in elevation above 5,100 feet. Therefore, the adjusted standard hold line separation distance for Runway 12-30 is 203 feet.

The design aircraft for this runway is the Q-400, a twin engine turboprop with a passenger seating capacity of 78 seats. The Q-400 is 107 feet long. Parallel Taxiway G is 300 feet from the runway, centerline to centerline. The OFA for Taxiway G is 186 feet as centered. Any holding Q400 will penetrate the taxiway OFA.

Further consideration should be given to relocating the hold lines associated with Runway 12-30 to a separation distance of 203 feet to meet the current design standard. There may be costs beyond paint removal and application such as guidance sign relocation and/or electrical line relocation.

HOLD LINE EXAMPLES

Attachment 2 shows examples of both a 737 and a 747 positioned at hold lines adjacent to Runway 8-26. The intent of these exhibits is to show both the penetration (or lack penetration) to the parallel taxiway OFA and the pilot line of sight when holding at a distance of 250 feet or 304 feet. The operational manuals for the example aircraft were utilized to determine the turning radius in order to present an accurate depiction of where the example aircraft would hold and to what degree it would be perpendicular to the runway.

Image A of Attachment 2 shows a 737-900 holding on Taxiway A2 at a distance of 250 feet. Its tail penetrates the Taxiway A OFA but it is perpendicular to the runway. Additionally, Image A shows the 737 holding at a distance of 304 feet at Taxiway A3. It penetrates the TOFA and it is not fully perpendicular to the runway.

Image B shows a Boeing 747-400 holding at a distance of 250 feet at Taxiway A2 and 304 feet at taxiway A3. The TOFA is penetrated in both scenarios. At Taxiway A2 the 747 can line up perpendicular to the runway but at A3 it is at an angle, thereby limiting pilot peripheral views of the runway.

TABLE WP6
D-IV Hold Line Analysis - Taxiway F

Taxiway	Runway Centerline to Twy F Centerline	Distance from Standard Hold Line (304') to Taxiway Centerline	Distance from Hold Line to Parallel Taxiway TOFA (D-IV: 259' centered)	Depth of TOFA penetration of a 737-900 (138 feet long) at standard hold position.	Able to line up aircraft perpindicular to runway at hold line (Yes/No)	Depth of TOFA penetration of a 757-300 (182 feet long) at standard hold position.	Able to line up aircraft perpindicular to runway at hold line (Yes/No)
C	450	146	16.5	-121.5	NA	-165.5	NA
F1	450	146	16.5	-121.5	No	-165.5	No
F3	450	146	16.5	-121.5	No	-165.5	No
F6	450	146	16.5	-121.5	No	-165.5	No

Image C shows that the 737-900 will not penetrate the Taxiway A OFA when holding at a distance of 250 feet on Taxiway A4. It will penetrate the OFA when holding at a distance of 304 feet. It can line up perpendicular to the runway at both 250 feet and 304 feet.

Image D shows the 747-400 at Taxiways A4 and D at distances of 250 feet and 304 feet. The 747 will penetrate the TOFA but it can line up perpendicular to the runway at both holding distances.

Image E shows that the 737-900 is clear of the TOFA and can line up perpendicular to the runway at Taxiways A9 and A10.

Image F shows that the 747 will penetrate the Taxiway A TOFA when holding at 250 feet and 304 feet at Taxiways A9 and A10. The 747 would be perpendicular to the runway at both locations.

Image G shows that the 737-900 will penetrate the Taxiway E OFA when holding at a distance of 304 feet but not at a distance of 250 feet at Taxiway A9 and A10. In both cases the 737 can be perpendicular to the runway.

Image H shows the 747-400 at Taxiway E9 and E10 at separation distances of 250 feet and 304 feet. At both hold line distances the 747-400 will penetrate the Taxiway E OFA. At 250 feet the 747 can line up perpendicular to the runway. At 304 feet the 747-400 would be at an angle.

Images J and K are presented simply to address OFA penetration questions for the high speed exits. Only the 747-400 at 304 feet would penetrate the Taxiway E OFA.

Images L and M shows both the 737-900 and 747-400 holding at Taxiways E3 and E4. Both are clear of the Taxiway E TOFA and are perpendicular to the runway.

OBSTACLE FREE ZONE CONSIDERATION

An additional consideration is the location of the runway obstacle free zone. The OFZ is an object clearing surface surrounding a runway that precludes aircraft or other penetrations. The runway OFZ and, when applicable, the precision obstacle free zone, the inner-approach OFZ, and the inner-transitional OFZ, compose the OFZ. All OFZ elements apply to Runways 8-26 and 3-21 as the visibility minimums are lower than ¾-mile. The OFZ was examined to determine if the current hold line locations (250 feet from the runway centerline) would cause a penetration by the aircraft.

The inner-transitional OFZ dimensions are a function of the nature of a precision instrument approach. Different dimensions apply to CAT-I versus CAT-II/III, with the latter being more restrictive. At the Sunport, there is a CAT-I instrument approach to Runway 8 and 3.

Attachment 3 shows examples of a Boeing 747 at a hold line and the location of the inner-transitional OFZ. Image A shows the Boeing 747 at a 250-foot hold line for a CAT I instrument approach. Inage B shows the same Boeing 747 at a separation distance of 304 feet. Under both scenarios, the inner-transition surface is clear. If a CAT-II/III instrument approach were implemented, then bubble of the Boeing 747 would penetrate the inner-transitional OFZ at 250 feet but it would be clear at 304 feet.

CONCLUSION

The following conclusions are drawn from this analysis:

1. The Sunport should consider changing its' design aircraft from the D-V (747) to the D-IV (757) which will have the immediate impact of reducing the minimum hold line separation standard from 334 feet to 304 feet.
2. On the north side of Runway 8-26 with hold lines at 304 feet, a holding 757 will penetrate the Taxiway A OFA.
3. On the north side of Runway 8-26 with hold lines at 304 feet, a holding 757 will not be able to line up perpendicular to the runway on the connecting taxiways except on A9, A10, A11, and A12.
4. On the south side of Runway 8-26 with hold lines at 304 feet, a holding 757 will penetrate the Taxiway E OFA at Taxiways E6-E12.
5. On the south side of Runway 8-26 with hold lines at 304 feet, a holding 757 will not be able to line up perpendicular to the runway on the connecting taxiways except on E10, E11, and E12.
6. For the connecting taxiways to Runway 3-21, a holding 757 will penetrate the Taxiway F OFA and it will not be able to line up in a perpendicular manner.

Recommendation

Three choices for action to be taken regarding the current MOD for hold lines at the Sunport are considered. The following applies the results of the analysis to each of the options:

1) Rescind the MOD (must meet the standard): This action would significantly and negatively impact the efficiency of ground movements, potentially causing capacity issues at the Sunport. This would be especially felt in the terminal area where Taxiway A and the terminal apron meet.

2) Issue a new MOD which reaffirms the intent of the previous MOD: This option should be considered in order to make a single recommendation (maintain hold lines at 250 feet) that is easy to understand and implement. The safety intent of the hold line separation standard is preserved because the design aircraft (either D-V or D-IV) would not penetrate the inner-transitional OFZ.

3) Issue a new MOD with revisions: This option may also be considered. The revisions may include issuing a MOD for specific hold lines. For example, Taxiway A1, A2, A3, and C might be allowed to have hold lines at 250 feet, while the remaining taxiway might have hold lines at 304 feet. The exact nature (which hold lines are affected) of a MOD with revisions would have to be determined in association with the FAA, as well as consideration of the costs of relocating the markings and signage.

U.S. Department of Transportation

Federal Aviation Administration

Memorandum

ABQ-MOD-04-001

Subject: ACTION: Modification of Standards - To Leave Mandatory Hold Positions at their Current Locations at Albuquerque International Sunport, Albuquerque, NM

Date: September 8, 2004

From: Manager, Airport Safety and Standards Branch, ASW-620

Reply to Attn. of: Bruce Kirkendoll, Lead Airport Certification Safety Inspector, ASW-621, 817-222-5621

To: Manager, Airport Safety and Operations Division, AAS-300

Construction Standards Affected: Federal Aviation Administration Advisory Circular (AC) 150/5340-1H, Standards for Airport Marking; and AC 150/5340-18C, Table 4, note d.; Standards for Airport Sign Systems, Table 1, Note 3.

Extent of Modification: To leave mandatory holdlines at the Albuquerque International Sunport at their current location of 250 feet from the centerline on Runways 8-26, and 3-21 These holdline are in compliance with the approved Airport Certification Manual, but are not in accordance with requirements for set-backs for field elevation as described in AC 150/5340-1H, Table 4, note d.; and AC 150/5340-18C, Table 1, Note 3.

The airport is currently indicating itself as an Airport Design Group D-V (B-747's) on the approved airport layout plan. Based on the airport's field elevation of 5,355 feet and precision approach minimums (200-1/2; the 2002 Airport Master Plan indicated obstructed visibility 21 days a year), holdlines need to be set back another 54 feet for Runway 8/26 (design group D-V) from their present location, and 22 feet for Runway 3-21 (Design Group C-IV). Currently, there are less than 500 civilian Design Group D-V aircraft operating at the airport per year. However, there are civilian Design Group C-IV aircraft (B-757's) operating in excess of 500 operations per year. As stated above, based on field elevation and approach minimums, the holdline setback for Design Group C-IV requires they be moved 22 feet. Based on current runway and taxiway separation moving holdlines to either 305 feet or 272 feet, could result in insufficient ramp separation, and capacity issues.

Duration of the Modification to Standards: This modification will remain in affect for the life of Runways 3/21 and 8/26, or until rescinded by the FAA.

FAA APPROVED

NOV 2 3 2004

Determination: We have determined this modification to the marking standard will not impede airport safety and based on historical data indicated in their letter is a valid request. Subject to your concurrence we intend to approve the proposed modification of standards.

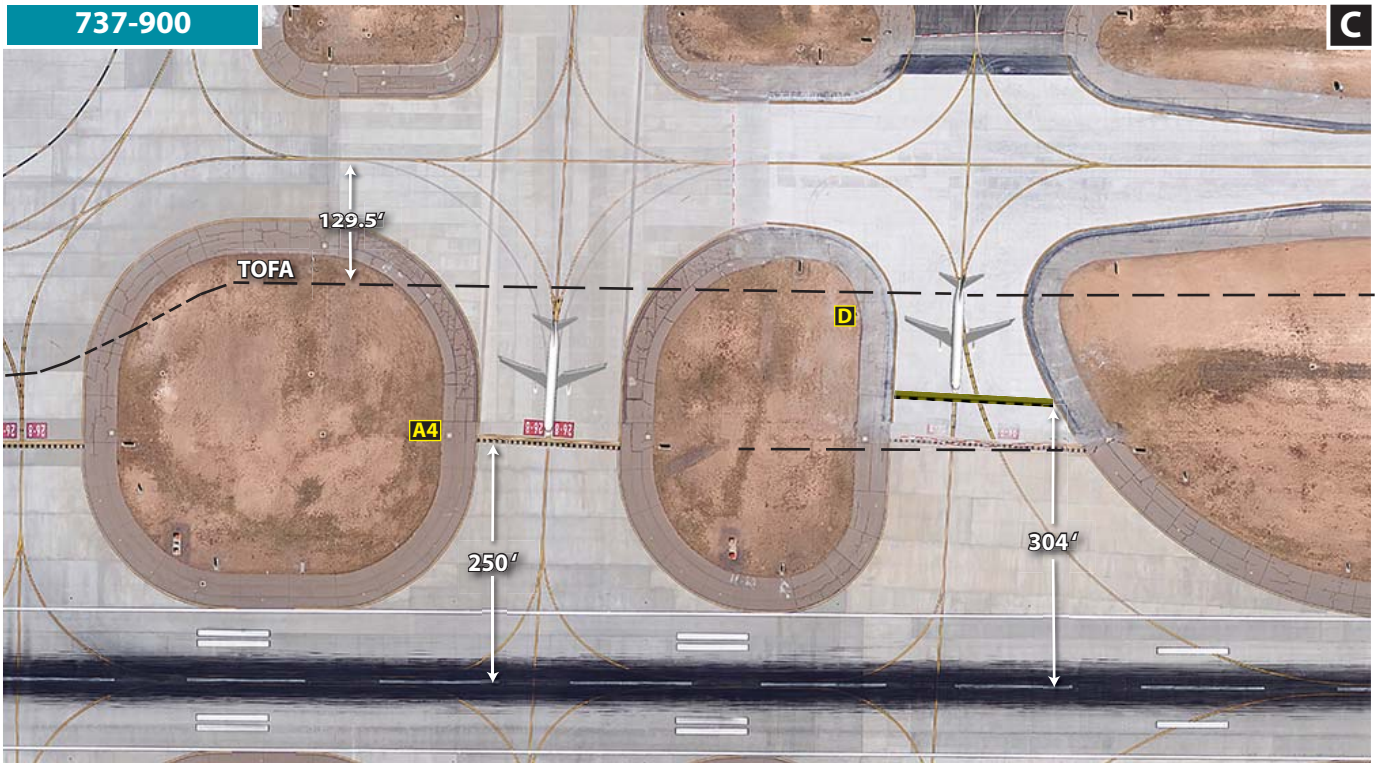
Recommended: _____
Joseph G. Washington, Manager, ASW-620

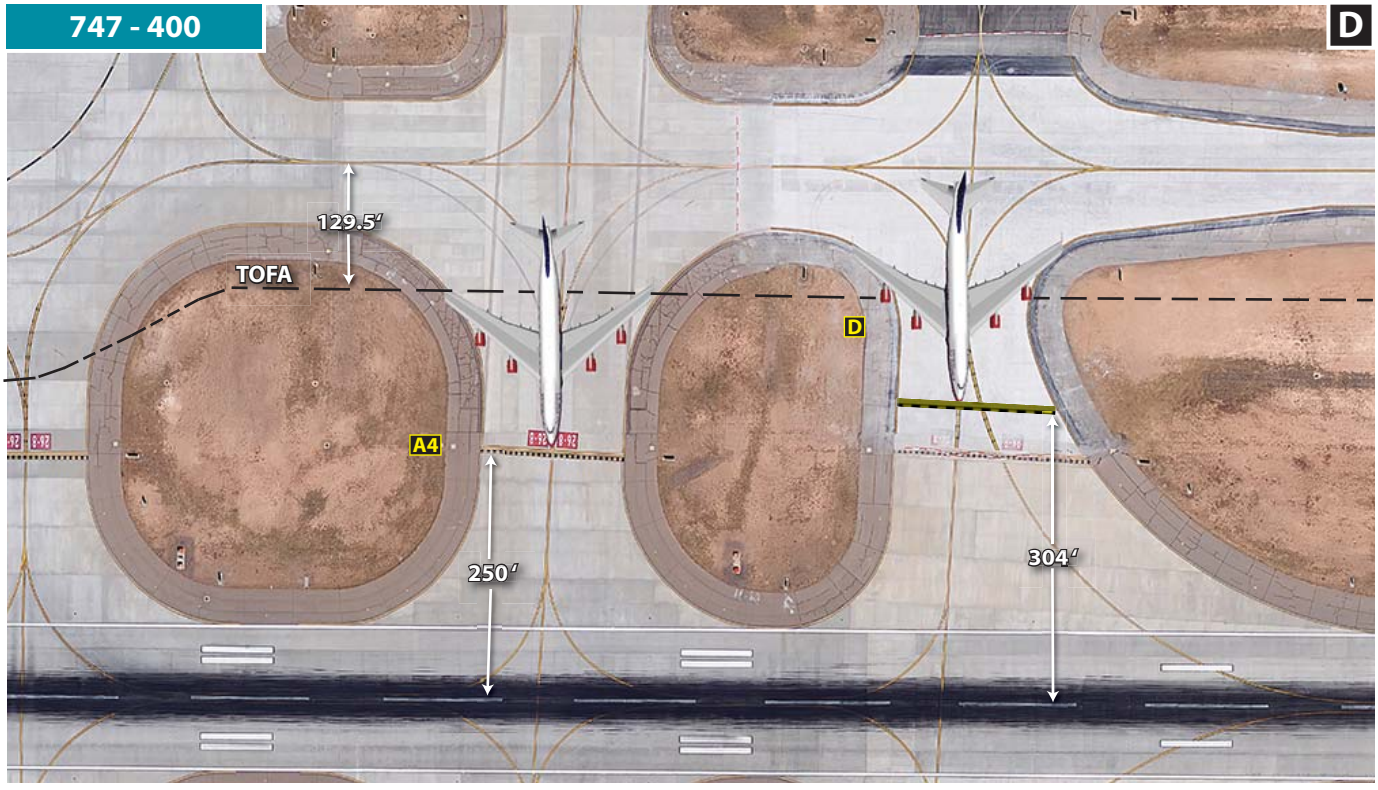
Approved/~~Disapproved~~: _____ 9/21/2004
Ben Castellano, Manager, AAS-300

Attachment

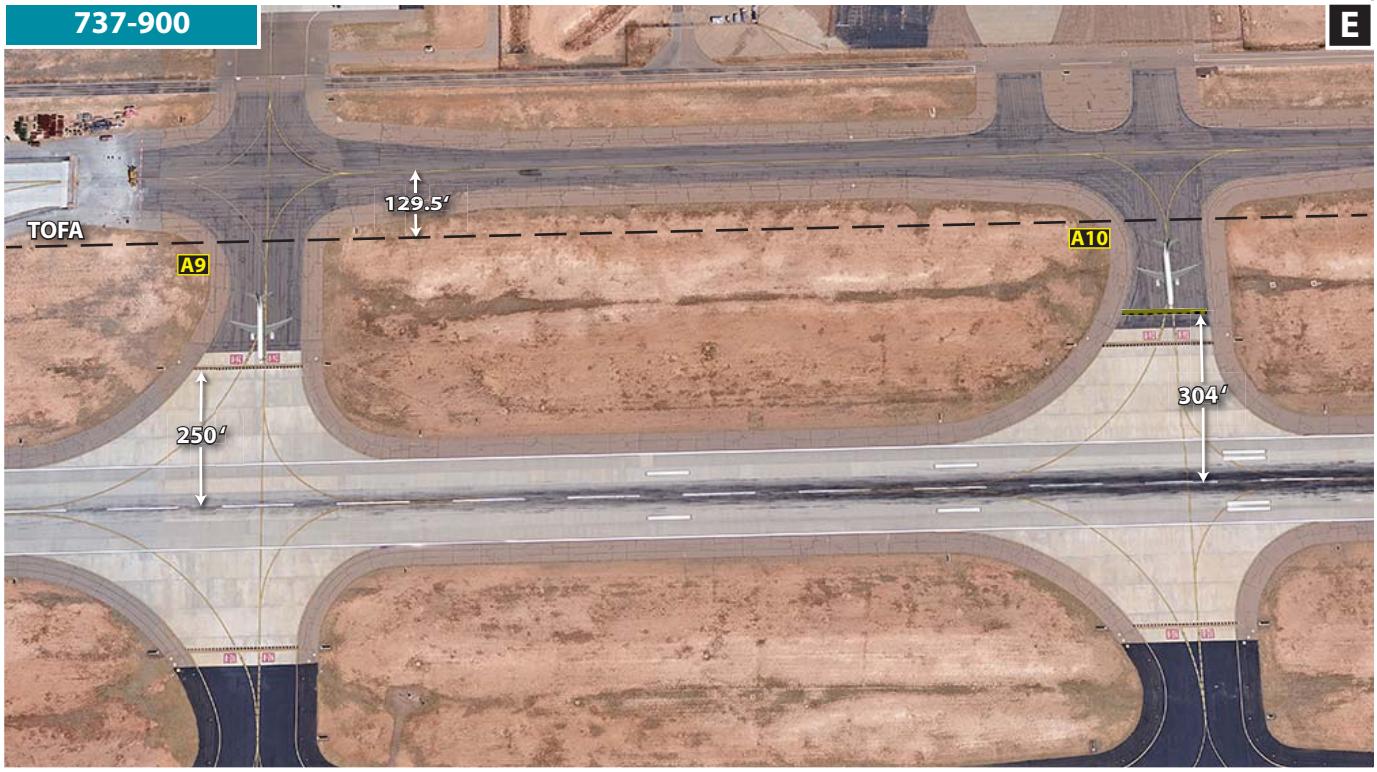
FAA APPROVED
NOV 23 2004

Taxiway A2 & A3
AIRPORT HOLD LINES 250′ AND 304′



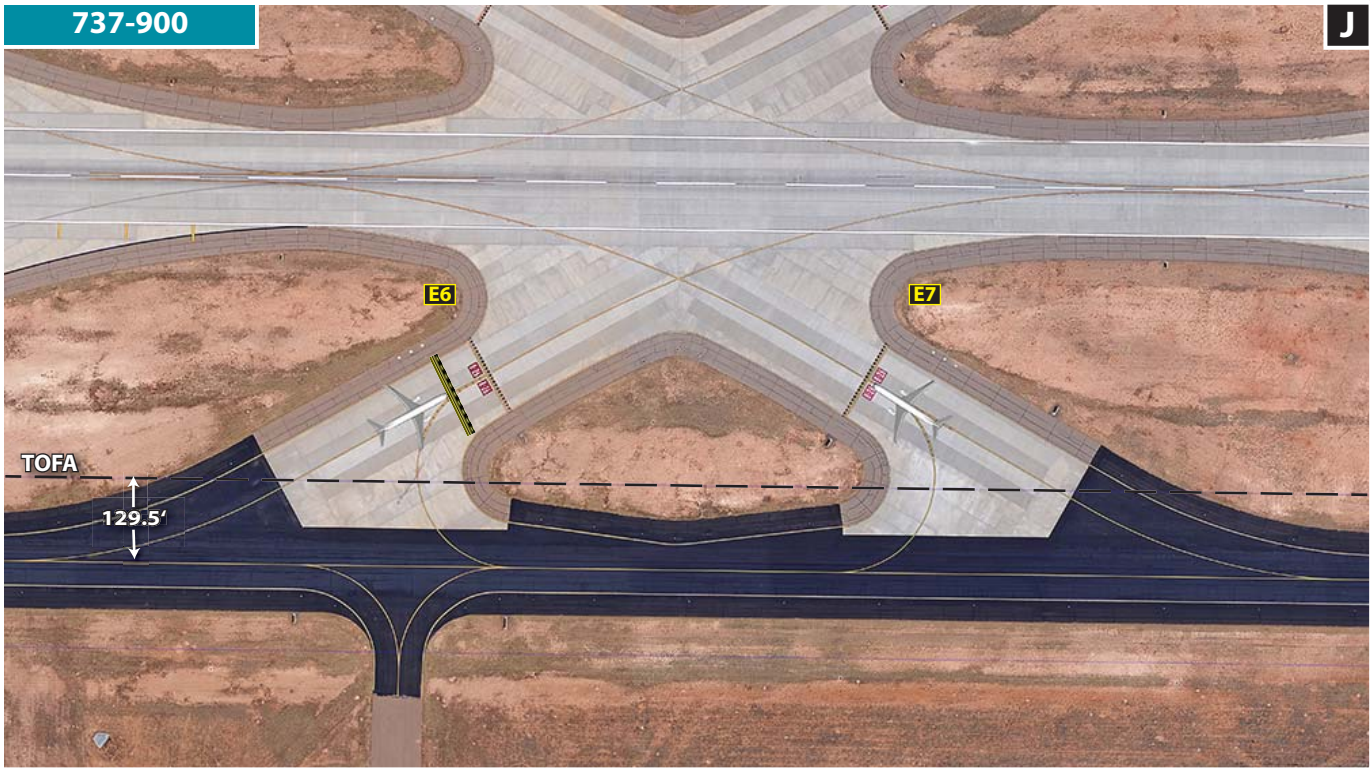


Taxiway A4 & D
AIRPORT HOLD LINES 250′ AND 304′

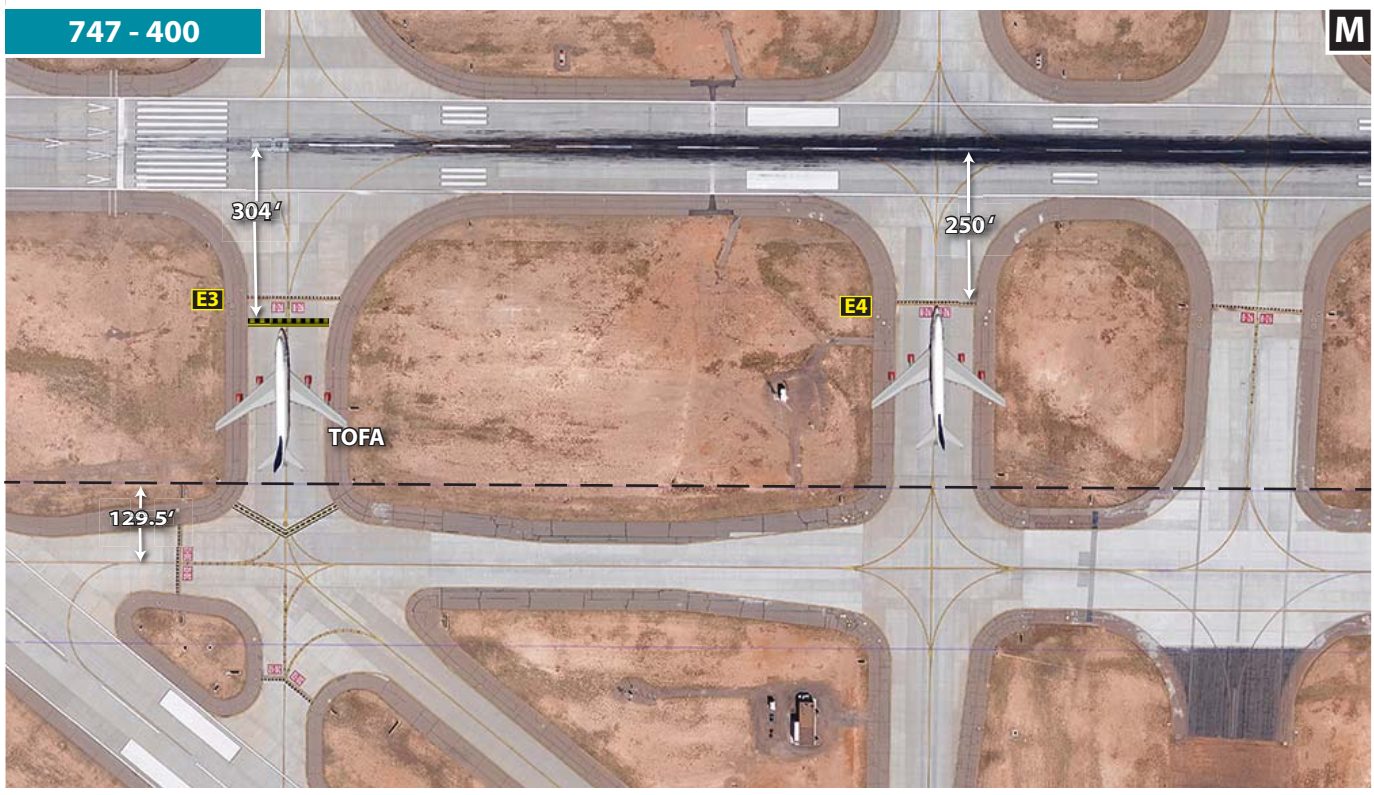


Taxiway A9 & A10
AIRPORT HOLD LINES 250′ AND 304′

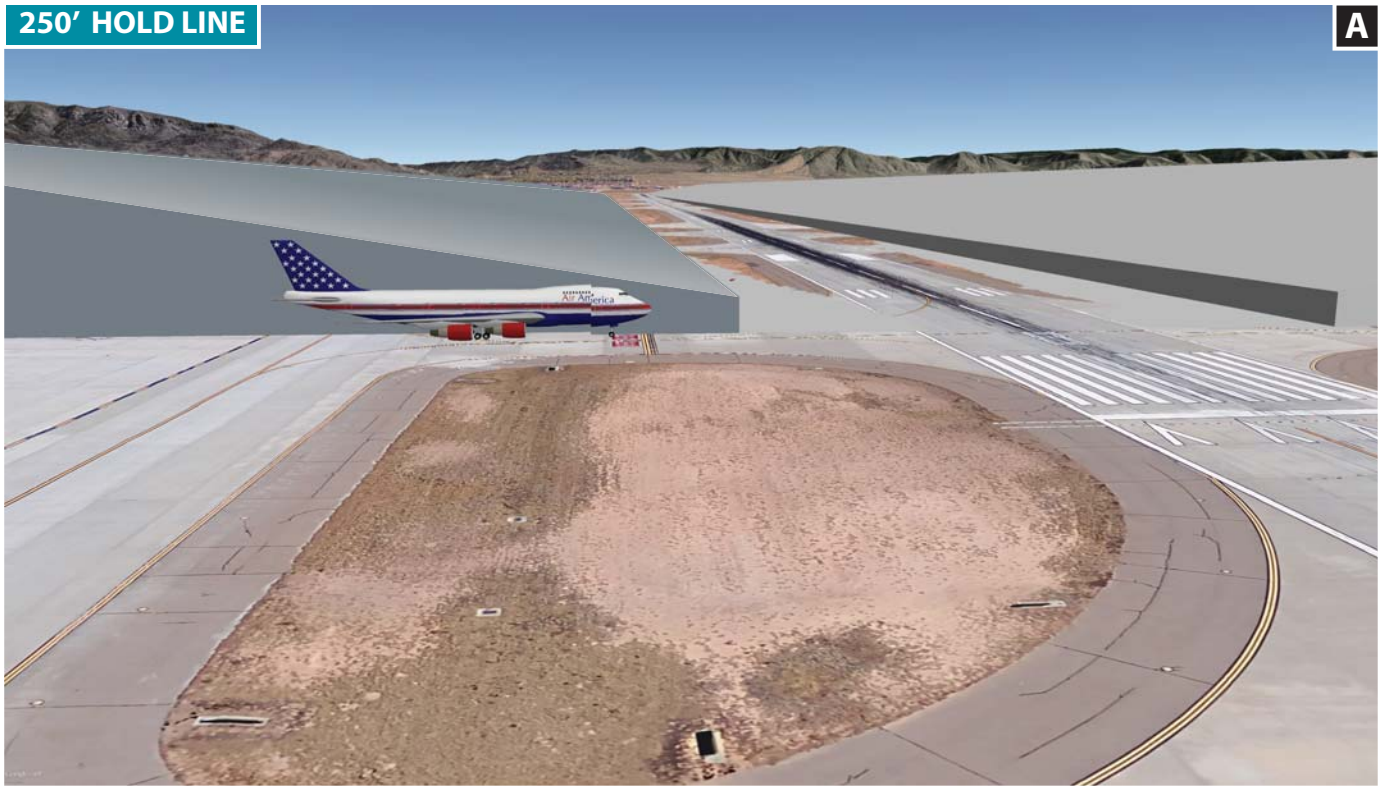
Taxiway E9 & E10
AIRPORT HOLD LINES 250′ AND 304′

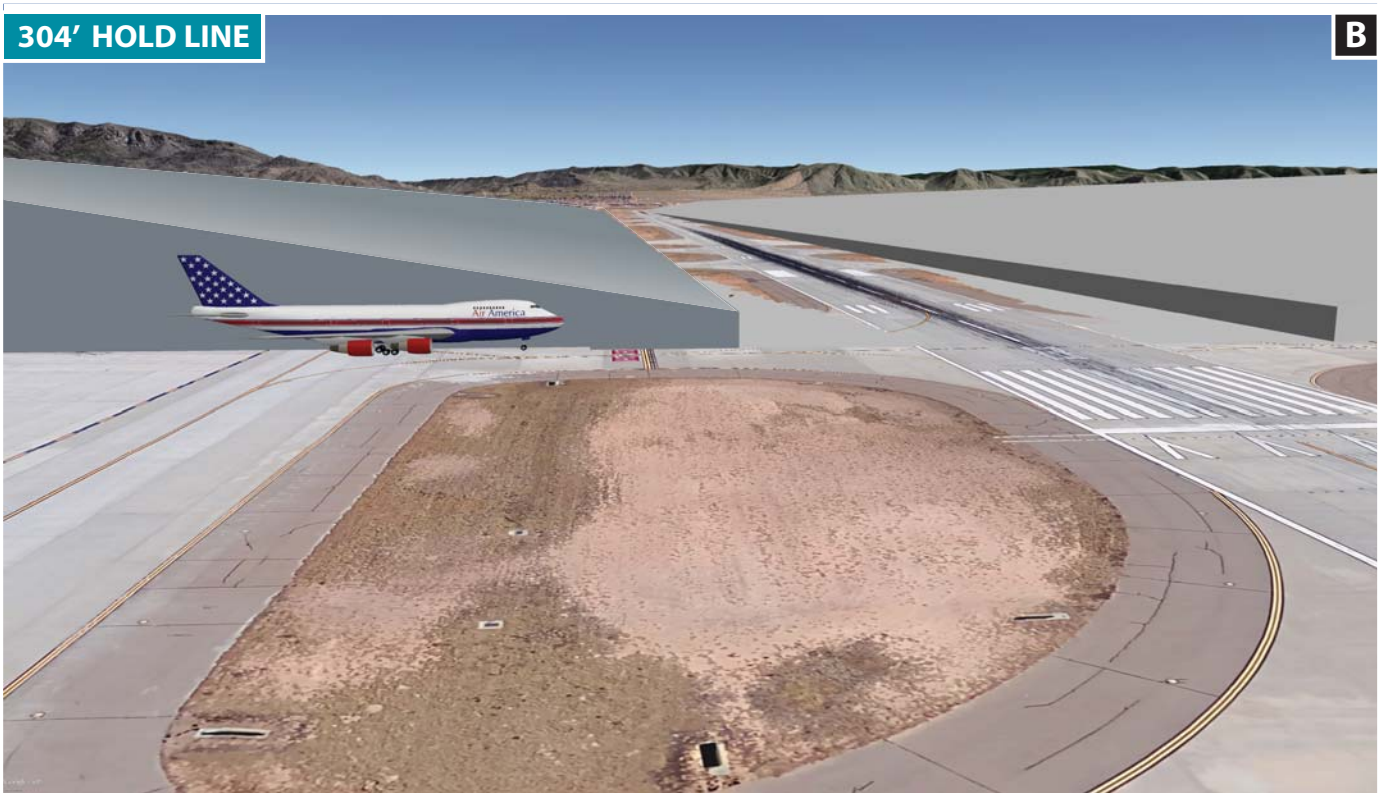


Taxiway E6 & E7
AIRPORT HOLD LINES 250' AND 304'



Taxiway E3 & E4
AIRPORT HOLD LINES 250′ AND 304′





CAT I INNER TRANSITIONAL OBSTACLE FREE ZONE
WITH A 747-400

Appendix E

TSS RUNWAY 8 WHITE PAPER

ABQ INTERNATIONAL SUNPORT

Sustainable Airport Master Plan

RUNWAY 8 APPROACH SURFACE PENETRATION
WHITE PAPER
Prepared by Coffman Associates for
ALBUQUERQUE INTERNATIONAL SUNPORT
February 2018

Existing Condition

Each runway end has a defined approach surface (not to be confused with the Part 77 Approach Surface) which is designed to protect the use of the runway in both visual and instrument conditions. The approach surface is also referred to as the threshold siting surface (TSS). The approach surface typically has a trapezoidal shape that extends away from the runway along the centerline and at a specific slope, expressed in horizontal to vertical ratio. The specific size, slope, and starting point of the approach surface depends upon the visibility minimums and the type of procedure associated with the runway end.

When approach surfaces are entirely clear of obstacles, instrument approach procedures can provide the optimum visibility and cloud ceiling minimums. When obstacles penetrate the approach surface, mitigation measures may include:

- Higher visibility minimums;
- Higher than normal glide path angles;
- Non-standard threshold crossing heights; and
- Final approach offset.

Exhibit 1 depicts the current Runway 8 approach surface which begins 200 feet behind the displaced landing threshold. The inner width is 800 feet, the outer width is 3,800 feet, and it is 10,000 feet long. The surface slopes up and away from the inner width at a 34:1 angle. Runways with a precision instrument approach, such as Runways 8 and 3 at the Sunport, also have a defined final approach "X" surface which must also meet the same obstacle clearing standards. The "X" surface begins at the sides of the approach surface, extending outward to 200 feet at a slope of 7:1.

Since the Runway 8 landing threshold is displaced by 1,000 feet, the approach surface and associated "X" surface encompass aircraft movement areas, most notably all or portions of Taxiways A, A1, A2, and E1. This includes runway hold lines on these taxiways. Therefore, an analysis of the height of aircraft in position at the hold lines must be undertaken to determine if they would be a penetration to the approach surface. **Table 1** presents this analysis when considering the three most critical aircraft in regular use at the Sunport (B757-200, B767-300, A300-600).

There is 24.58 feet of clearance at Taxiway A1 and E1 and 11.88 feet of clearance at Taxiway A2. The tail of all three aircraft will penetrate the approach surface at all three hold positions. The fuselage of the 757 and 767 is clear at Taxiway A1 and E1, but each aircraft fuselage penetrates the approach surface at Taxiway A2.

Because Taxiway E1 is longer than Taxiways A1 or A2, there is a possibility that the hold line could simply be moved back to provide adequate clearance of the approach surface. An additional row is included in the table to present the distance the Taxiway E1 hold line would have to be moved to provide that clearance for the three aircraft. For the 757-200 to clear the "X" approach surface, the hold line at

Taxiway E1 would need to move back (south) 68.25 feet. For the longer and taller A300-600, the hold line would have to move back (south) 112.63 feet. It is assumed that the solution to the hold line issue for Taxiway E1 is to move it back (south) based on the critical design aircraft (A300-600).

TABLE 1
Approach Surface Penetration Analysis: Taxiways A1, A2, and E1
Albuquerque International Sunport

Aircraft Characteristics	Boeing 757-200	Boeing 767-300	Airbus 300-600
Length	155.25'	180.25'	177.42'
Fuselage Height	21.17'	24.58'	25.33'
Tail height	45.08'	52.58'	54.58'
Approach Surface Penetration Results at Taxiway A1 Hold Line			
Fuselage Penetration	Clear by 3.41'	Equal to TSS (Clear)	0.75'
Tail Penetration	20.5'	28.0'	30.0'
Approach Surface Penetration Results at Taxiway A2 Hold Line			
Fuselage Penetration	9.29'	12.7'	13.45'
Tail Penetration	33.2'	40.7'	42.7'
Approach Surface Penetration Results at Taxiway E1 Hold Line			
Fuselage Penetration	Clear by 3.41'	Equal to TSS (Clear)	0.75'
Tail Penetration (X Surface)	9.75'	13.68'	16.09'
Distance to shift hold line for clearance	68.25'	95.76'	112.63'

Assumptions at the hold line:
Twy A1 and E1: Ground Elevation (5,312.0'); Approach Surface Height (5,336.58'); Clearance (24.58')
Twy A2: Ground elevation (5,313'); Approach Surface Height (5,324.88'); Clearance (11.88')

The following design alternatives address the approach surface penetration that exists when certain aircraft hold at either Taxiway A1 or A2.

Alternative A – Relocate Hold Lines

Exhibit 1 presents the first alternative which re-positions the hold line from Taxiway A1 to Taxiway A at a location between Taxiways A2 and A3. This would be positioned at the front of the approach surface. Once cleared for departure by the control tower, aircraft would then proceed for 1,150 feet to the runway centerline using Taxiway A1. The current hold line is 250 feet from the runway centerline. Aircraft transiting from the passenger terminal to the runway would have the option to position behind the second hold line that would be established on the terminal taxilane 550 feet from the runway centerline. The taxi distance to the runway from this hold line would be nearly identical to that of the hold line on Taxiway A.

This arrangement will have a negative impact on airfield capacity and delays as aircraft will have a significantly longer taxi time after being cleared for departure. Arriving aircraft will have a longer sequence time as the tower will have to provide additional separation time for the taxiing aircraft to reach the departure threshold, power up, and takeoff. This alternative will also increase aircraft queueing on Taxiway A and on the terminal taxilane, especially during the morning peak times. In

LEGEND

- Runway Safety Area (RSA)
- Runway Protection Zone (RPZ)
- Central Portion of RPZ
- Taxilane Object Free Area
- TSS Approach Surface (Runway 8 - 34:1, Runway 12 - 20:1)
- Runway 8 Final Approach "X" Surface (TERPS) 7:1
- Glide Slope Critical Area
- RPZ Incompatible Land Uses (7.77 acres)
- Precision Obstacle Free Zone (POFZ)
- Refueler Route Inside RPZ
- Pavement to be Removed
- Taxilane Island

HOLD LINE

HOLD LINE

NO-TAXI ISLAND

EXISTING 8' GROUND CLEARANCE FROM RUNWAY 8 APPROACH SURFACE

EXISTING 24' GROUND CLEARANCE FROM RUNWAY 8 APPROACH SURFACE

HOLD LINE

7.77 acres

757

737-800

737-800

757

737-800

A300-600

A1

A2

A3

A

E1

E3

E

NORTH

0 300 600

SCALE IN FEET

Exhibit 1
APPROACH SURFACE MITIGATION ALTERNATIVE A

addition, access for arriving aircraft to the northwest side of the terminal (Concourse A) will effectively be blocked by aircraft holding for departure.

Procedurally, this alternative will reduce existing movement efficiency and reduce capacity while increasing controller workloads. For these reasons, airport management desires an alternate solution.

Another safety consideration with the current runway threshold is the location of the air carrier refueling stand within the runway protection zone (RPZ). This alternative would maintain the stands within the RPZ, albeit on the edge of and well below the "X" surface.

Alternative B – Create Hold Pad

The second alternative, shown on **Exhibit 2**, considers holding aircraft to the west of the terminal taxilane. Under this alternative, existing ramp area between the terminal area apron and the snow barn would be converted into dual taxilanes to create a holding pad. Aircraft would queue awaiting their turn to depart.

The taxi distance from the closest of the two taxilanes (westernmost) is approximately 600 feet from the runway centerline. The distance from the second taxilane is approximately 800 feet to the runway centerline. The hold lines on the hold pad depicted on the exhibit are located at the edge of the Taxiway Object Free Area (TOFA), which is 129.5 feet from the centerline of Taxiway A. This location also provides adequate clearance under the "X" surface.

While a shorter taxi distance than Alternative A, this alternative still presents some significant challenges. The hold line on Taxiway A previously discussed with Alternative A will still be needed. Aircraft approaching the Runway 8 threshold from the east on Taxiway A would need to wait for clearance to proceed west to the terminal taxilane, then turn north on the terminal taxilane. These aircraft then turn to the west to line up to the hold pad queuing area. Finally, they would be released to proceed to the runway for departure. This procedure represents many stop and go movements and it may be confusing to pilots unfamiliar with the layout.

The hold pad concept does little to solve concerns with aircraft queueing on Taxiway A and, in some ways, could make it more challenging because of all the turns. In addition, the hold line on Taxiway A would still be required, thus slowing access to the northwest side of the terminal.

Utilization of this area for a holding apron could create conflicts for service vehicles because of the immediate proximity to the snow barn, refueling station, fuel truck storage, and glycol truck storage areas. These vehicles would need to traverse the holding area to reach the aircraft at the terminal. The distance from the runway centerline is reduced compared to Alternative A (1,050 feet), but at 600 to 800 feet is still two to three times longer than the current hold line distance to the runway.

The area is currently used for parking RON (remain overnight) aircraft. Conversion to a holding apron would require relocation of the RON space to a location east of the terminal that would be very inconvenient for airlines operating from the gates on Concourse A. The Master Plan does have an east RON area planned to provide additional RON capacity. If this alternative is implemented, additional space for RON aircraft would need to be constructed.

As with Alternative A, the fuel stands would continue to be within the RPZ.

Alternative C – Remove Runway 8 Displaced Threshold

Alternative C considers removing the Runway 8 displaced threshold altogether, thereby relocating the beginning of the approach surface 200 feet beyond the runway end. As a result, the taxiways would no longer be impacted by it. This alternative would allow aircraft to hold at Taxiways A1 and A2 in their current locations without penetration of the approach surface. The hold line on Taxiway E1, however, would need to be set back an additional 100 feet to be outside the relocated glide slope critical area. **Exhibit 3** presents this alternative.

Runway 8 is equipped with an Instrument Landing System (ILS). It is critical that the ½-mile minimums associated with this approach be preserved, especially at a medium hub commercial service airport. At present, the ILS equipment is required to support these minimums, meaning the glide slope, approach lights, and touchdown zone lights would need to be relocated, along with other runway marking and signage. The exhibit depicts the relocated glide slope antenna along with the associated glide slope critical area. The glide slope critical area must be clear of any aircraft or other objects that could potentially disrupt its signal. Part of the reason for the current runway displacement is to maintain the critical area off Runway 12-30. Since the glide slope critical area associated with relocation would cross Runway 12-30, this runway would need to either be shortened or shifted southeast to avoid conflicts with the glide slope signal. The exhibit shows the Runway 12 threshold relocated 600 feet. At an airport elevation of 5,355 feet, it is likely that some general aviation aircraft that use the runway would be more weight restricted. Those aircraft may need to utilize one of the other two runways available. Small piston aircraft that are not turbocharged could be the most impacted by a reduction in length. Wind rose analysis indicates that small aircraft would use this runway 3.6 percent of the time for crosswinds, compared to 10.5 percent on the other runways. The draft Master Plan recommended a length of 5,500 feet which would provide design crosswind runway coverage. As shown on the exhibit, a length of 5,400 feet could be maintained without an extension on the other end of Runway 12-30.

The medium intensity approach lighting system with runway alignment indicator lights (MALSR) would need to be relocated 1,000 feet west to coincide with the end of the runway. The bases of the existing MALSR lights could still be used, but five new foundations for new and taller towers would be needed for the light lane relocation. The final two would be west of University Boulevard but would remain on Sunport property. With the steep falling terrain beyond the end of the runway safety area (RSA), the foundation for the lights farthest from the runway would be at an elevation approximately 135 feet below the runway elevation. The portion of the MALSR currently installed in-pavement would be deactivated.

The runway and taxiway geometry resulting from this alternative would better meet design standards, and in many ways, is superior to what currently exists. Perhaps most importantly, this layout allows for the runways to be completely decoupled with no back-taxi on Runway 12-30. The access to the Runway 12 threshold is redesigned to be less confusing by providing a typical 90-degree threshold taxiway. This would eliminate the need for back-taxiing to the Runway 12 threshold (assumes access from Taxiway E-1 is eliminated as already proposed in the Master Plan). The existing wide expanse of pavement created by the confluence of Taxiways E, E1, and G would be eliminated. This too would be an improvement on what exists currently, as just a small portion of the RSAs of the two runways would be in common.

The approach RPZ leading to Runway 8 would also be shifted farther to the west. With this shift, additional incompatible land uses would be introduced to the RPZ. Currently, there are approximately 7.77 acres of incompatible land uses in the existing RPZ. These include rental car facility parking lots and structures and a portion of Access Road B. Shifting the RPZ would encompass a total of 15.69 acres of

LEGEND

- Runway Safety Area (RSA)
- Runway Protection Zone (RPZ)
- Central Portion of RPZ
- Taxilane Object Free Area
- TSS Approach Surface (Runway 8 - 34:1, Runway 12 - 20:1)
- Runway 8 Final Approach "X" Surface (TERPS) 7:1
- Glide Slope Critical Area
- RPZ Incompatible Land Uses (7.77 acres)
- Precision Obstacle Free Zone (POFZ)
- Refueler Route Inside RPZ
- Pavement to be Removed
- Taxilane Island

HOLD LINE

HOLD LINES

HOLD LINE

EXISTING 8' GROUND CLEARANCE FROM RUNWAY 8 APPROACH SURFACE

EXISTING 24' GROUND CLEARANCE FROM RUNWAY 8 APPROACH SURFACE

HOLD LINE

7.77 acres

757

757

757

757

737-800

757

737-800

A300-600

A

A1

A2

A3

E1

E3

E

NORTH

0 300 600

SCALE IN FEET

Exhibit 2
APPROACH SURFACE MITIGATION ALTERNATIVE B

FUTURE APPROACH LIGHT STANDARDS

EXISTING APPROACH LIGHT STANDARDS

15.69 acres

NO-TAXI ISLAND

RELOCATED GLIDE SLOPE

HOLD LINE

737-800

A300-600

600'

SCALE IN FEET

0 300 600

NORTH

A

A1

A3

E3

E

E3

G

E1

G1

12

Runway 12-30 5,400' x 150'

LEGEND

- Runway Safety Area (RSA)
- Runway Protection Zone (RPZ)
- Central Portion of RPZ
- TSS Approach Surface (Runway 8 - 34:1, Runway 12 - 20:1)
- Runway 8 Final Approach "X" Surface (TERPS) 7:1
- Glide Slope Critical Area
- RPZ Incompatible Land Uses (15.69 acres)
- Precision Obstacle Free Zone (POFZ)
- Ultimate Airfield Pavement
- Refueler Route Inside RPZ
- Pavement to be Removed

Exhibit 3
APPROACH SURFACE MITIGATION ALTERNATIVE C

incompatible land uses. While all the structures from the rental car facility would be removed from the RPZ, a two-story office building west of University Boulevard would fall within the RPZ, although outside of the central portion of the RPZ. Additional road segments would be introduced including more of Access Road B, University Boulevard, and George Road. It should be noted, however, that all the incompatible land uses, both existing and future, are at elevations 40 to 100 feet below the Runway 8 threshold. All but some roadway segments are outside the area referred to as the central portion of the RPZ. This is an important mitigating factor when considering RPZ land use compatibility.

This alternative would remove not only the fuel stand from the RPZ, but also the service road used by empty refueler trucks as the return route to the fuel stand.

Alternative D – Move Runway 8 Displaced Threshold 600 Feet

Options of moving the displaced threshold to a point between its current location and the Runway 8 end were considered. **Exhibit 4** depicts a 400-foot displaced threshold, which would be 600 feet west of its current location.

The problem created by the current displaced threshold location is that aircraft holding on Taxiways A1 and A2 penetrate the TSS approach surface, as do aircraft on the segment of Taxiway A between those two taxiways. Alternative D would allow aircraft to hold on A2 for an intersection take-off and still be able to use 13,300 feet of runway for takeoff. Aircraft preferring to utilize the entire 13,793 feet of runway would hold on Taxiway A just beyond A2 until cleared. A concern with Taxiway A2 is direct access from the terminal area taxilane. This could be resolved by relocating the taxilane 150 feet west, as proposed for a Concourse B extension in the Master Plan and shown on **Exhibit 4**.

As with Alternative C, the glide slope and MALSR would need to be relocated, but only three new bases for approach light standards would be required instead of four. All would remain east of University Boulevard. The greatest elevation change from a light standard base and the runway end would be 120 feet. Like Alternative C, Runway 12-30 would need to be shortened to approximately 5,400 feet to remain outside of the glide slope critical area.

Alternative D reduces the acres of incompatible uses within the RPZ when compared to Alternative C. The RPZ also avoids the office building across University Boulevard, although part of the building's parking lot is inside the RPZ. In fact, it has the least amount of building square footage inside the RPZ of all five alternatives. As with the other alternatives, the only incompatible uses inside the central portion of the RPZ are roadways. **Exhibit 4** does show how a portion of University Boulevard could be relocated outside the RPZ, reducing the incompatible acreage inside the RPZ from 13.6 acres to 11.5 acres.

As with Alternative C, this alternative would remove the fuel stand from the RPZ, although a portion of the service road used as the return route by empty refuelers would remain just inside.

Alternative E – Maintain Runway 8 RPZ East of University Boulevard

At the request of the Federal Aviation Administration (FAA), an alternative that would keep University Boulevard outside the RPZ was examined. As depicted on **Exhibit 5**, this would limit moving the displaced threshold approximately 350 feet to the west of its current location.

While this alternative would keep University Boulevard outside of the RPZ, it does little to correct the queuing problems created by Alternatives A and B. The displaced threshold would be aligned with Taxiway A2, such that the precision object free area (POFA) would include the length of the taxiway. This would reduce the taxiway's effectiveness as a bypass taxiway. An aircraft at the hold line on Taxiway A awaiting clearance to proceed to the end of Runway 8 would block Taxiway A2 as well. Departing aircraft coming from Concourse B gates would still have to hold on the apron, blocking arriving aircraft from taxiing to Concourse B. The hold line on Taxiway E1 could be set approximately 50 closer to Runway 8 than with Alternative D.

As with the two previous alternatives, the glide slope and MALSR would need to be relocated. Since the shift in the displaced threshold is not on an increment of 200 feet, however, new foundations would be required for all seven relocated approach light standards. In addition, all in-pavement approach lights would have to be reset into new concrete cuts. The greatest elevation change from a light standard base and the runway end would still be approximately 120 feet. Like Alternatives C and D, Runway 12-30 would need to be shortened to approximately 5,400 feet to remain outside of the glide slope critical area.

At 9.5 acres, Alternative E would have less incompatible acreage inside the RPZ than either Alternative C or D. The air carrier fuel stands on the north side would not be inside the RPZ; however, the service road used as the return route and a portion of the queueing area for refuelers would still be inside.

Recommendation

If constructing these same runways from a brown field today, Alternative C would be preferred because it safely decouples the runways as well as eliminates the displaced threshold. Under present conditions, however, it is the most expensive of the five options. Clearly the least expensive is Alternative A, which would simply mark Taxiway A with a hold line between Taxiway A2 and A3. However, this has the most significant impact on airfield delay and aircraft movement efficiency due to the longer taxi distance from the hold line to the Runway 8 centerline. Alternative B would be more expensive and introduce multiple aircraft maneuvers and hold positions. Both Alternatives A and B would increase controller workload. In addition, the air carrier fuel stand would remain within the RPZ.

Alternatives C, D, and E shorten Runway 12-30 by 600 feet (the runway was extended from 5,000 feet to 6,000 feet in the 1990s). The RPZ in Alternative C would not only extend across University Boulevard, but also encompass an office building. University Boulevard could be relocated to the back of the RPZ, but not outside it without acquiring a portion of the privately-owned and operated parking lot to the west. Alternative D would keep the RPZ off the office building but would still cross University Boulevard. While most of University Boulevard could be relocated west of the RPZ, it would still need to run through a back corner portion of it to avoid relocating two private commercial/office buildings. Alternative E keeps the RPZ inside of University Boulevard, but at the expense of correcting the circulation efficiency and delay problems created by Alternatives A & B. It would also introduce multiple aircraft maneuvers and hold positions.

Alternative A is, at best, a short-term solution until a more permanent solution can be implemented. The better permanent solution would be Alternative C, but this is also the most expensive. The primary conflicts with Alternatives 3 and 4 are larger areas of incompatible uses within the RPZ than the alternatives that do not change the threshold displacement.

FUEL STANDS

HOLD LINE

NO-TAXI ISLAND

SCALE IN FEET 0 300 600

NORTH

737-800

737-800

A

A1

A3

REALIGN UNIVERSITY BOULEVARD

FUTURE APPROACH LIGHT STANDARDS

EXISTING APPROACH LIGHT STANDARDS

600'

E3

RELOCATED GLIDE SLOPE

11.5 acres

HOLD LINE

A300-600

RENTAL CAR SERVICE AREA

E

E3

12

G

E1

Runway 12-30 5,400' x 150'

G1

LEGEND

- Runway Safety Area (RSA)
- Runway Protection Zone (RPZ)
- Central Portion of RPZ
- TSS Approach Surface (Runway 8 - 34:1, Runway 12 - 20:1)
- Runway 8 Final Approach "X" Surface (TERPS) 7:1
- Glide Slope Critical Area
- RPZ Incompatible Land Uses (15.69 acres)
- Precision Obstacle Free Zone (POFZ)
- Ultimate Airfield Pavement
- Refueler Route Inside RPZ
- Pavement to be Removed

Exhibit 4
APPROACH SURFACE MITIGATION ALTERNATIVE D

FUEL STANDS

HOLD LINE

0 300 600
SCALE IN FEET

NORTH

NO-TAXI ISLAND

737-800

A

HOLD LINE

HOLD LINE

FUTURE APPROACH LIGHT STANDARDS

EXISTING APPROACH LIGHT STANDARDS (TO BE REMOVED)

A1

A3

600'

E3

9.5 acres

RELOCATED GLIDE SLOPE

HOLD LINE

A300-600

E

RENTAL CAR SERVICE AREA

E3

G

E1

12

Runway 12-30 5,400' x 150'

G1

LEGEND

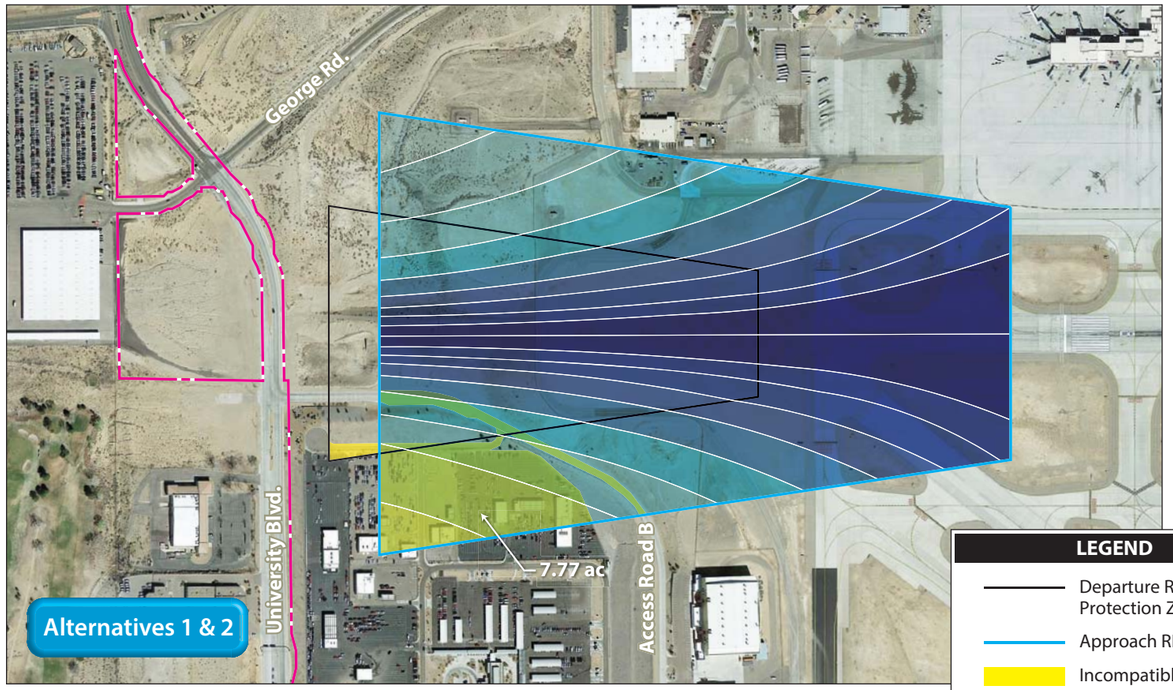
- Runway Safety Area (RSA)
- Runway Protection Zone (RPZ)
- Central Portion of RPZ
- TSS Approach Surface (Runway 8 - 34:1, Runway 12 - 20:1)
- Runway 8 Final Approach "X" Surface (TERPS) 7:1
- Glide Slope Critical Area
- RPZ Incompatible Land Uses (15.69 acres)
- Precision Obstacle Free Zone (POFZ)
- Ultimate Airfield Pavement
- Refueler Route Inside RPZ
- Pavement to be Removed

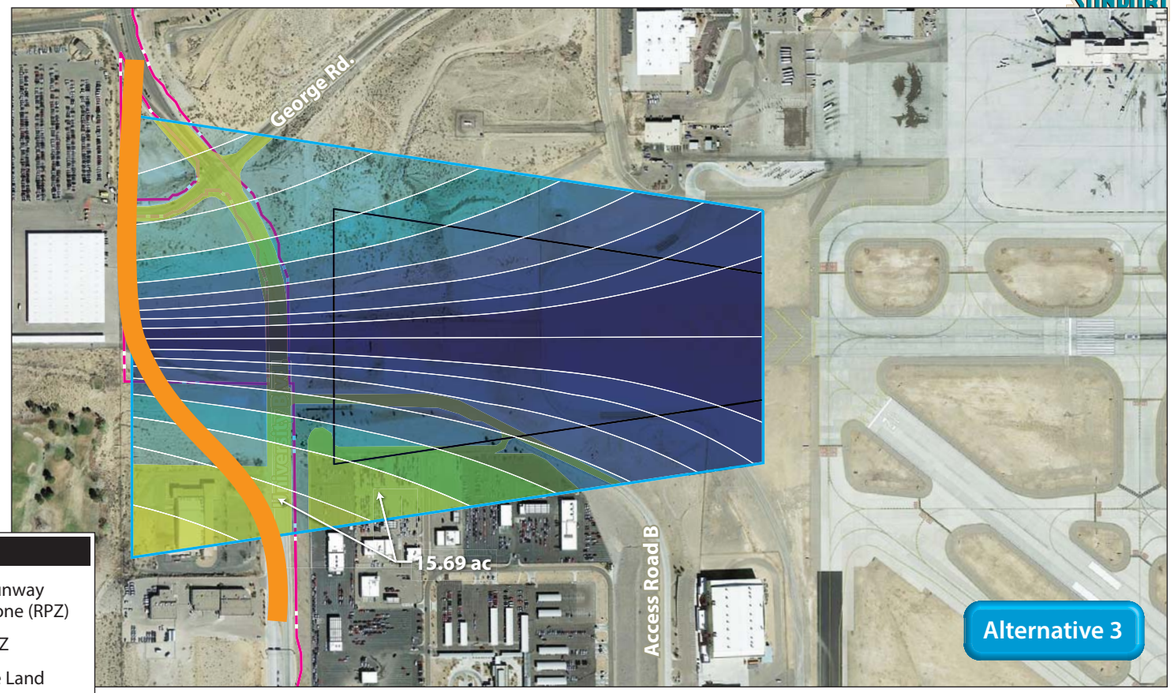
Exhibit 5
APPROACH SURFACE MITIGATION ALTERNATIVE E

Most of these conflicts are outside the central portion of the RPZ, except in the case of University Boulevard, which remains in the back portions of the RPZ. The Airport Cooperative Research Program (ACRP) funded Research Report 168 – *Runway Protection Zones (RPZs) Risk Assessment Tool Users' Guide*. The risk assessment tool was developed under ACRP Project 04-18, with the intent to to help airport operators conduct risk assessments in RPZs. The tool can be used to assess the risk of an aircraft accident within an RPZ and, based on the output, assess the risk to people and property, based on land use and population density.

Based upon site-specific data, the tool can generate crash likelihood contours within the RPZ, as well as statistical risk probability. A generalized set of likelihood contours have been placed on the RPZ for each alternative in **Exhibit 6**. As might be expected, locations closer to the runway's landing threshold and closer to the extended centerline have higher likelihoods of a crash than locations on the farther corners of the RPZ. Although more than 100 feet below the runway elevation, University Boulevard does encroach upon the RPZ with Alternatives C and D. The exhibit also depicts how this roadway could be re-routed, if necessary, to further reduce the potential risk.

It becomes evident from the exhibit that most of the incompatible land uses in each alternative are in areas of lower risk. To fully understand the level of risk and the risk differences between alternatives, the Sunport's data would need to be run in the Risk Assessment Tool for each alternative. Besides an alternative-specific likelihood contour, the analysis would provide results in the form of the "Annual RPZ Crash Likelihood" and the "Average Number of Years Between Accidents." These can then be weighed against other safety risks. Unless there would be a significant increase in risk with their implementation, Alternatives C or D would be the best long-term option for the Sunport. After review and discussion with the FAA, Alternative D was recommended as the preferred alternative.





LEGEND

- Departure Runway Protection Zone (RPZ)
- Approach RPZ
- Incompatible Land

Annual Crash Likelihood Contours

- 2.75e-008
- 4.44e-008
- 6.66e-008
- 9.82e-008
- 1.45e-007
- 2.19e-007
- 3.42e-007
- 5.75e-007
- 1.28e-006

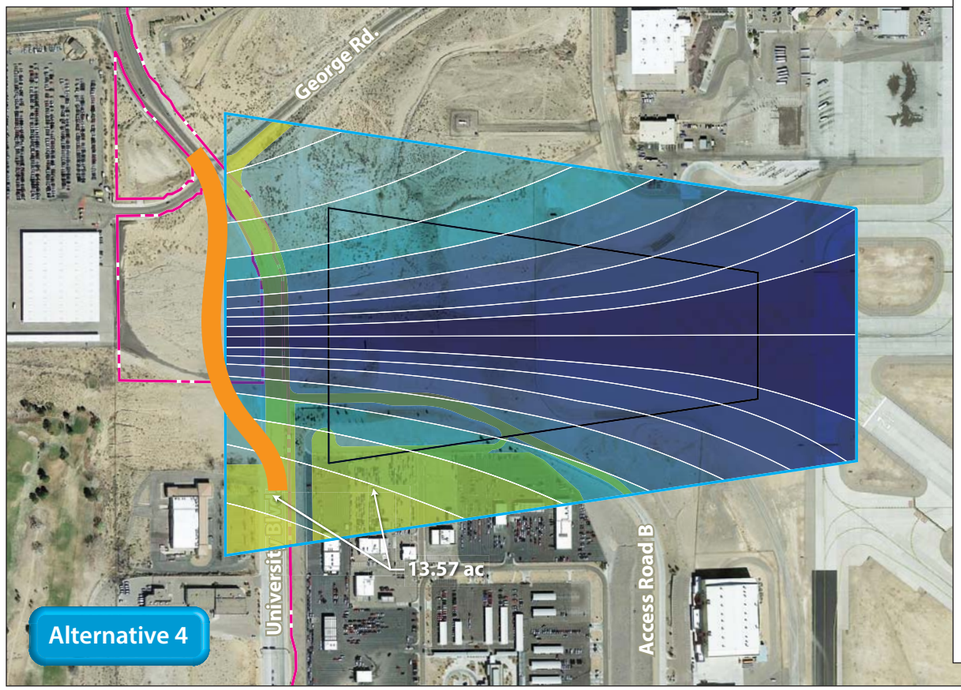
Source: ACRP Research Report on Runway Protection Zone (RPZs) Risk Assessment Tool Users' Guide, 2016.

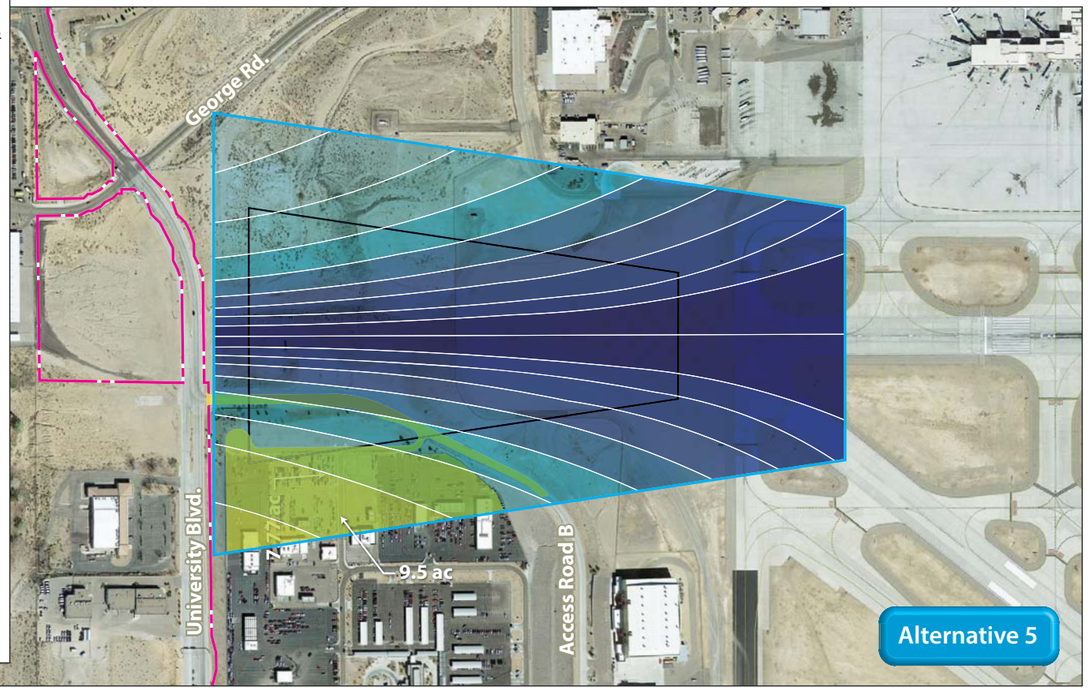
NORTH

0 600

SCALE IN FEET

Aerial Source: Google Earth 3/9/2014





Appendix F

SRM RUNWAY 12-30 FINAL REPORT

ABQ INTERNATIONAL SUNPORT

Sustainable Airport Master Plan

ALBUQUERQUE INTERNATIONAL SUNPORT (ABQ)

ALBUQUERQUE, NEW MEXICO

HOT SPOT #1 MITIGATION

Safety Risk Management Panel Meeting

March 2016

Contents

1. SUMMARY 2
2. PROJECT DESCRIPTION 4
3. FAA AIRPORTS SAFETY ASSESSMENT PROCESS 11
4. AIRPORT SYSTEM FEATURES 12
5. SRM PANEL MEETING 12
6. HAZARD ASSESSMENTS 15
7. CONCLUSION 19

APPENDIX A. Safety Assessment Screening Form 21

APPENDIX B. Hazard Assessment Worksheet 24

APPENDIX C. Agenda and Attendance List 27

Prepared by:
Applied Research Associates
7184 Troy Hill Dr., Suite N
Elkridge, MD 21-75

1. SUMMARY

Albuquerque International Sunport (ABQ) is completing a Sustainable Airport Master Plan that will describe the improvement of facilities to meet future demand, and to maintain an adequate, safe, and reliable airport. One important goal of the master planning process is to provide for continuous safety improvement. Accordingly, the master plan is considering several alternatives to achieve compliance with FAA airport design standards and to address issues associated with four (4) designated hot spots on the air field. Hot spots are defined as confusing intersections near runways that are more likely to contribute to runway incursions.

ABQ is conducting a Safety Assessment to evaluate alternative airfield configuration options that will address Hot Spot #1 on the FAA Airport Diagram (See Figure 1). A December 15-16 Safety Assessment panel meeting evaluated hazards and risks associated with five alternatives proposed by the ABQ planning team. These alternatives are intended to "decouple" the Runway 08 and 12 thresholds to prevent pilots from inadvertently lining up on the wrong runway. The panel reviewed each alternative and decided to eliminate two of these alternatives from the safety assessment because:

- They could not comply with FAA threshold siting criteria,
- They would introduce new problematic taxiway configurations that would not reduce overall risk levels, or
- They would shorten an existing runway to the point that it could no longer satisfy aeronautical demand at the airport

The remaining three alternatives, designated as **1B**, **1C**, and **2** were evaluated in terms of hazards, risk levels and risk mitigation measures where the panel concluded that they were necessary. The panel found that alternative **1B** presented an initial risk level of **low** while the remaining two were rated as **medium**. Although each of these alternatives can be modified to provide acceptable risks, the panel does not recommend alternative **2** because significant loss of runway length would impact aeronautical need requirements.

The planning team will use the results of the Safety Assessment to develop a final Airport Layout Plan (ALP) for submittal to the FAA for review and approval. For medium hub airports such as ABQ, the FAA requires a Safety Assessment in accordance with Order 5200.11 prior to approval of ALP submittals. The work under this Safety Assessment complies with FAA Order 5200.11 for planning projects. However, additional safety assessments or a follow-on to this assessment may be needed depending upon the final ALP submittal.

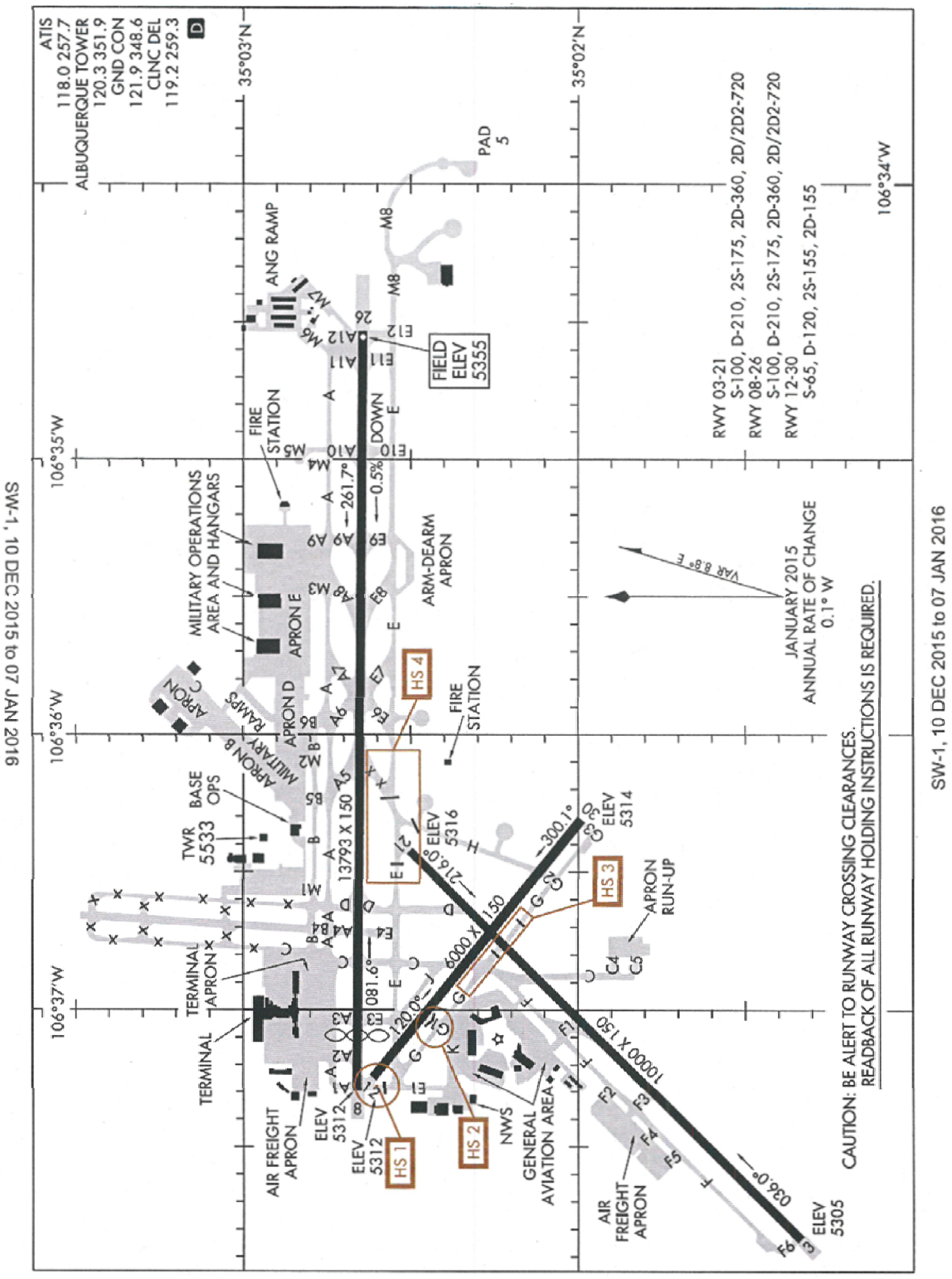


Figure 1- Airport Diagram.

2. PROJECT DESCRIPTION

Albuquerque International Sunport is currently in the process of developing a Sustainable Airport Master Plan (SAMP). Coffman Associates, a national airport planning firm based in Kansas City, Missouri, is the prime consultant on the project. Molzen-Corbin is the Airport consulting engineer and is a sub-consultant on the SAMP project. The SAMP is considering various alternatives to correct Hot Spot #1 on the airfield. The FAA Airport/Facilities Directory describes this Hot Spot as follows:

> *The hold position marking on Taxiway E1 is the hold short position for both Runway 8 and 12. When instructed by the tower to move beyond this point, pilots must ensure the proper alignment on the correct runway.*

This Hot Spot is also identified by FAA as a Runway Incursion Mitigation (RIM) program location. The RIM is a preliminary inventory of airport locations where runway incursions have occurred. An analysis of data collected from 2007-2013 indicates that these locations experienced three or more peak annual runway incursions in a given year or more than six runway incursions cumulative during the study period. According to RIM data, ABQ Hot Spot #1 experienced nine runway incursions during this period. FAA has a priority to work with airports on mitigation strategies for these locations.

Correction of Hot Spot #1 is considered to be a near term ALP improvement. Airfield changes to address the remainder of the Hot Spots and other aeronautical needs at ABQ will be proposed at a future date as the SAMP unfolds. As of the date of the Safety Assessment meeting, five alternatives are being considered by the planning team:

Alternative 1A

This alternative, as shown in Figure 2, leaves the Runway 12 threshold in place, thereby providing the longest runway length of all of the alternatives. A new Runway 12 threshold entrance taxiway would provide a typical 90-degree entrance and eliminate the “in-line” taxiway arrangement where pilots approaching the threshold are unable to clearly determine the runway designation. This alternative would also move the Runway 08 hold bar further south to provide proper clearance for the threshold siting surface. As shown by Figure 2, the result creates problems with the new threshold taxiway to Runway 12 where two hold bars that would effectively only handle a single aircraft.

Alternative 1B

This alternative, as presented in Figure3, removes 75 feet of length from Runway 12. This allows for two separate taxiways (E1 and the new Runway 12 threshold entrance) with separate hold bars. While there is enough room to accommodate two aircraft simultaneously at the hold positions for Runway 08 and Runway 12, there are still some clearance issues for large aircraft. This solution introduces a new taxiway to an already wide expanse of pavement created by the intersection of Taxiways E, E1, and G.

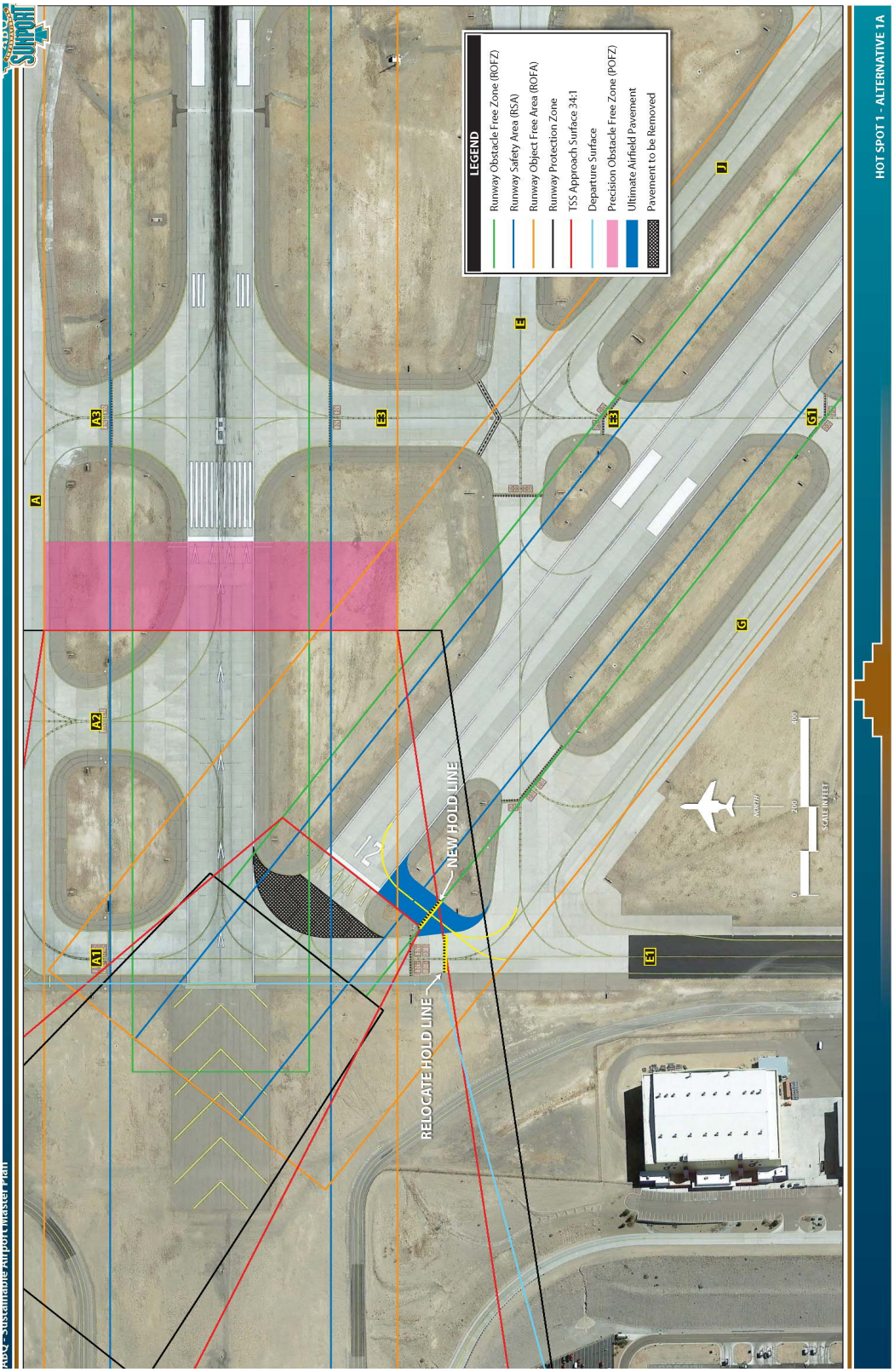


Figure 2- Alternative 1A.

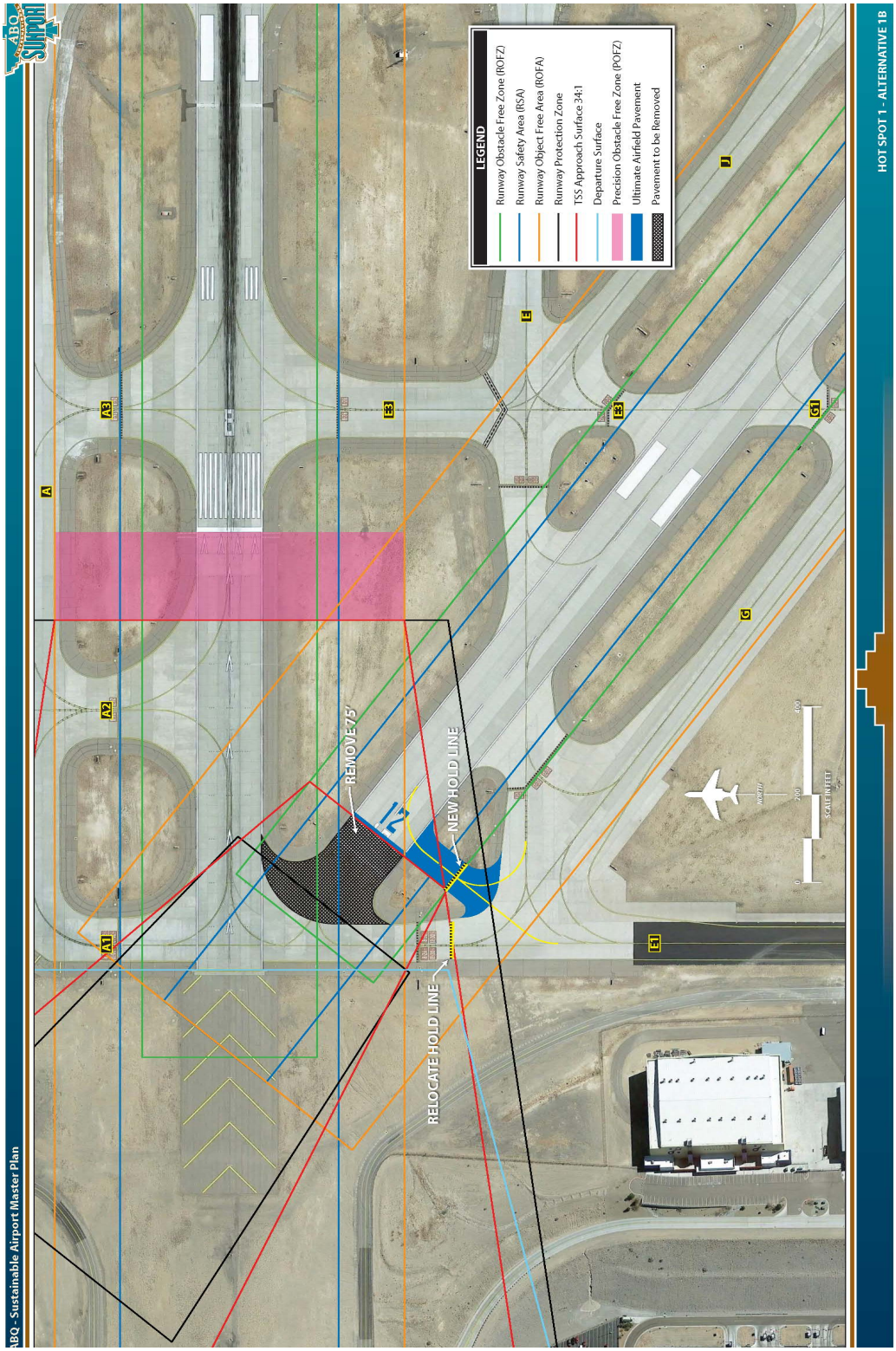


Figure 3- Alternative 1B.

Alternative 1C

This alternative, as presented in Figure 4, considers removing 150 feet of Runway 12 length and then adds a new threshold entrance taxiway to Runway 12. This alternative provides the necessary spacing to holding aircraft and for signage. This alternative also considers closing that portion of Taxiway E between Runway 12-30 and Taxiway E1 to simplify the complex and wide taxiway intersection.

Alternative 2

This alternative, as shown in Figure 5, shortens Runway 12 by 350 feet. It also simplifies taxiway intersections by removing parallel Taxiway E to the west of Taxiway E3 and replacing it with a Runway 12 threshold entrance taxiway. This alternative greatly simplifies the intersection of taxiways E1 and G.

Alternative 3

This alternative, presented in Figure 6, is similar to Alternative 2, except that it shortens Runway 12-30 by 1,000 feet in order to provide a “cleaner” Runway 12 threshold entrance taxiway. The resulting runway length (5,000 ft) is below what the planners are recommending for this runway.

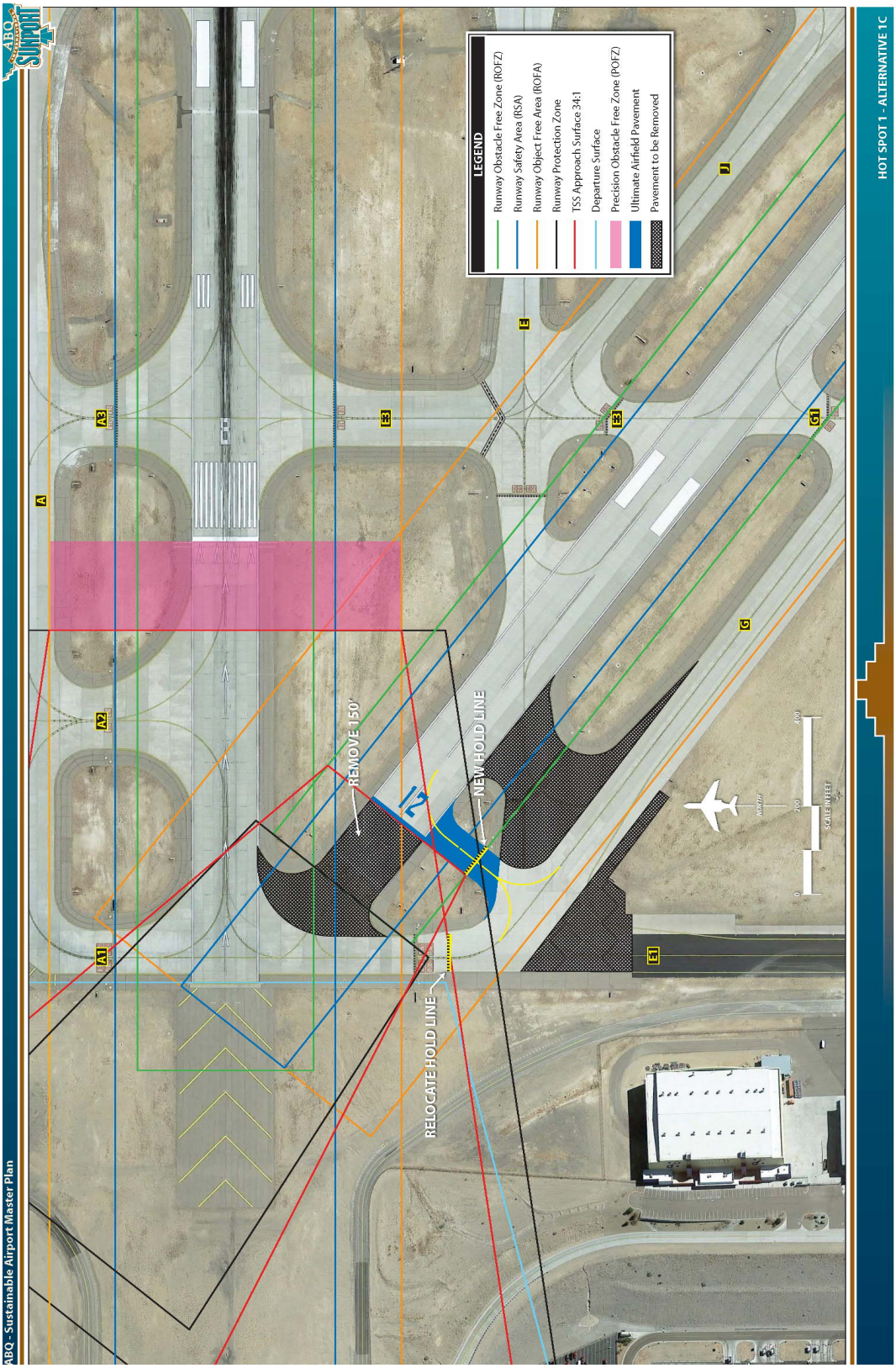


Figure 4- Alternative 1C.

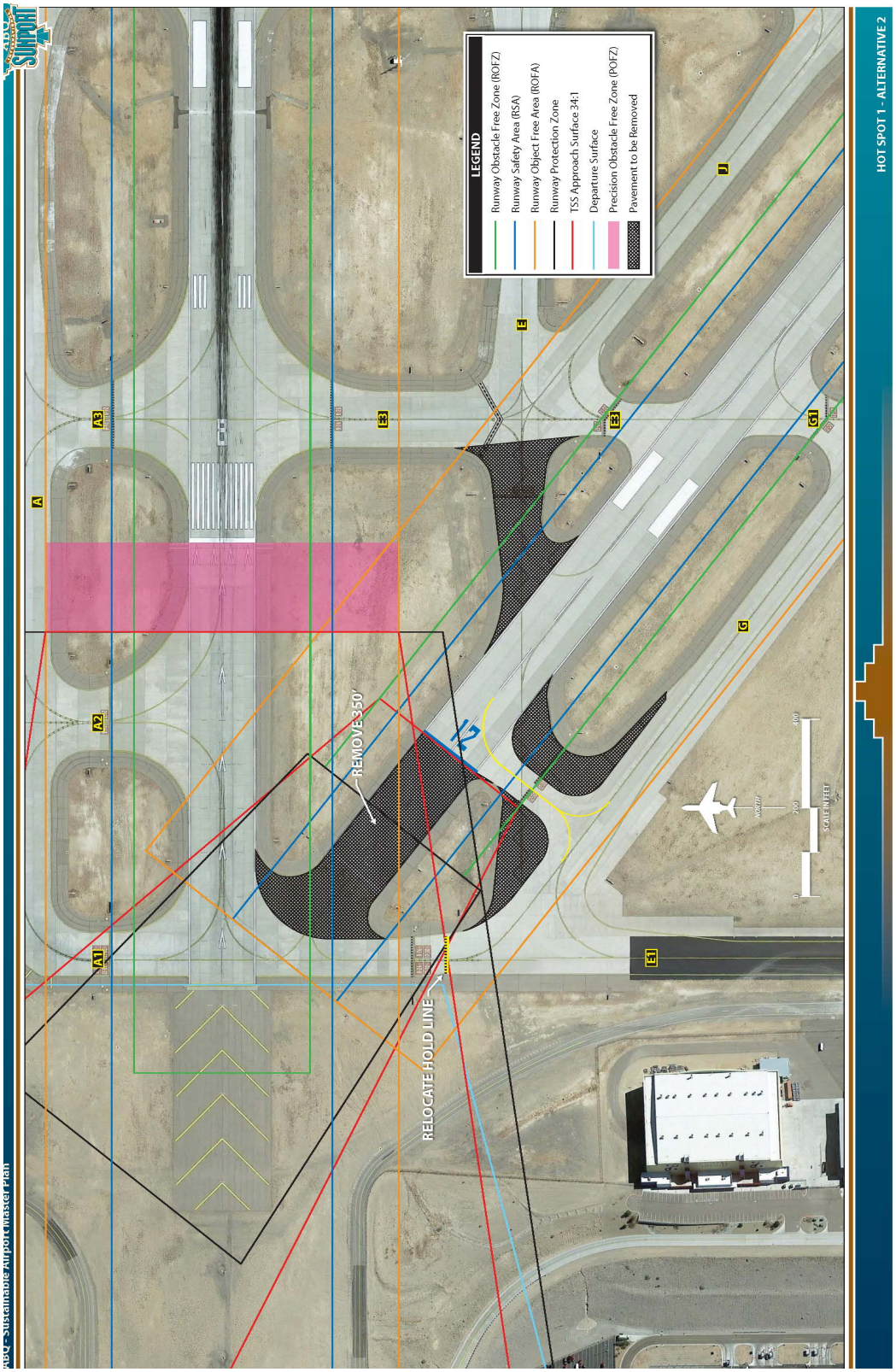


Figure 5- Alternative 2.

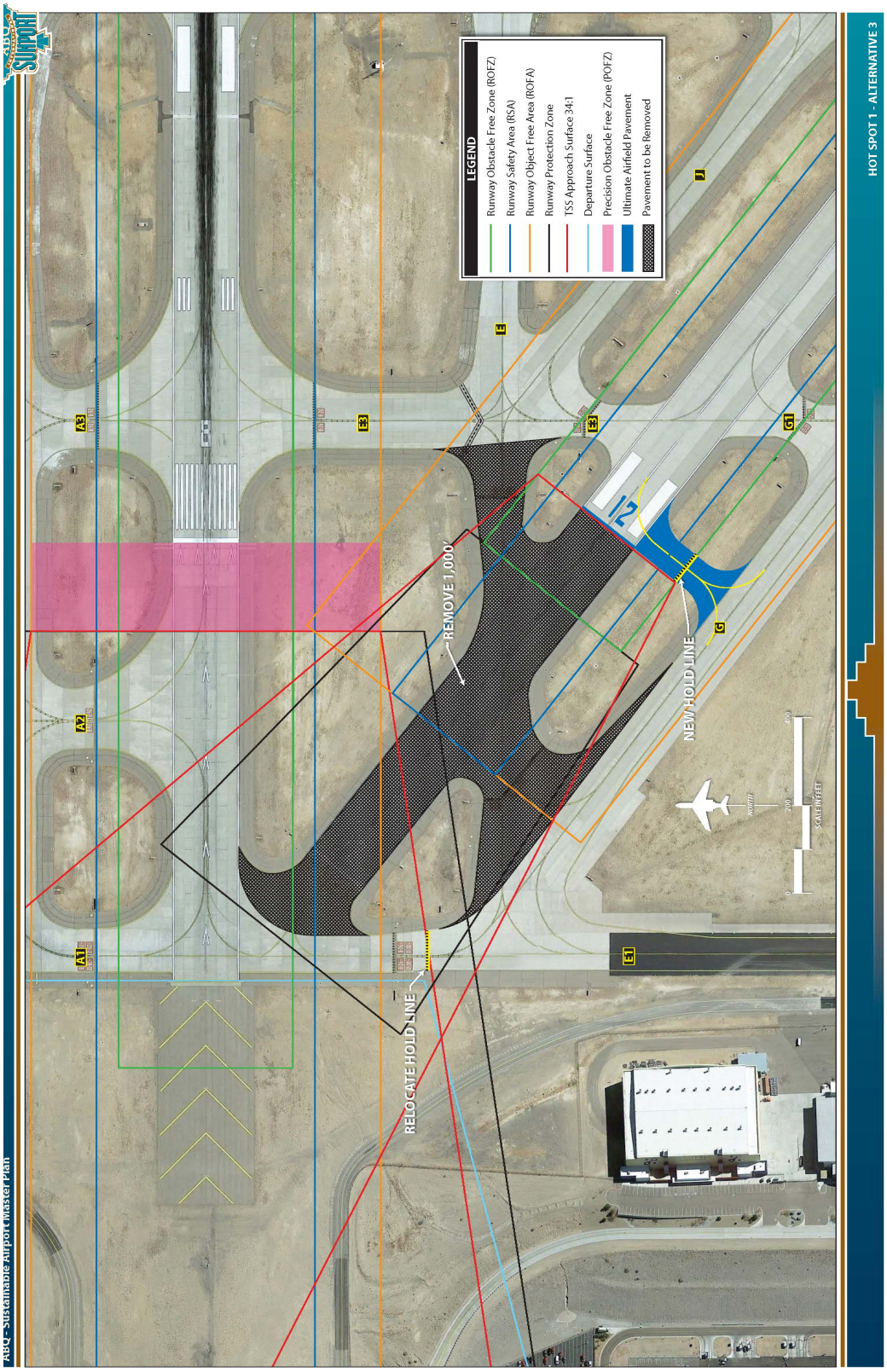


Figure 6- Alternative 3.

3. FAA AIRPORTS SAFETY ASSESSMENT PROCESS

FAA Order 5200.11 implements FAA Airport's (ARP's) requirements for a Safety Management System (SMS). This order requires the application of safety risk management principles whenever ARP reviews or approves an airport sponsor's proposals that could affect aviation safety. Specifically, FAA is required to perform SRM in connection with:

- Submittal of new or revised Airport Layout Plans (ALPs) for FAA approval
- FAA review and approval of construction safety and phasing plans
- FAA airspace determinations for airport sponsor requests for non-construction airport changes submitted by FAA Form 7480-1, Notice of Landing Area Proposal
- FAA approval of Part 150 noise compatibility programs and program changes that may affect aviation safety
- FAA approval of an airport sponsor's request for a Modification of Standards
- Final FAA approval of new and updated airport planning, design, or construction standards

These requirements do not apply to the approval or enforcement of Airport Certification Manuals under 14 CFR Part 139. SMS requirements related to Part 139 are the subject of a separate proposed rulemaking action. Instead, these requirements are the result of Federal obligations and grant assurances for airports that accept Federal financial assistance. Accordingly, an SRM process (safety assessment) is required to support the review and approval of the updated ALP for ABQ.

The FAA uses a Safety Assessment Screening (SAS) form as a decision and documentation tool for determining the applicability of FAA SRM requirements and for determining the need for an SRM panel to examine hazards, risks, and mitigations. Appendix A is the completed SAS form for this Safety Assessment. Block 6 of the form indicates whether an SRM panel is needed to complete the Safety Assessment. Prior to the Safety Assessment meeting, the FAA project manager determined that a panel was needed because the proposed alternatives might:

- Increase aviation safety risks, with existing controls in place
- Adversely affect aviation operations with existing controls in place
- Affect navigational aids
- Impact TERPS surfaces

Note that prior to the panel meeting, the SAS form makes no judgement as to whether the project would actually impose any new risks on the system. It merely documents situations where risks might be a concern and allows the SRM panel to proceed with a more thorough examination. The SRM panel completes the process by completing a Hazard Assessment Worksheet (HAW) that documents the five-step SRM process defined by Order 5200.11.

The panel used a Comparative Safety Assessment (CSA) approach to document hazard and risk findings for multiple alternatives. The CSA provides decision makers with a listing of all potential hazards along with a risk

assessment for each alternative-hazard combination that is considered. It is used to rank and compare options for decision-making purposes.

The completed SAS form requires three sets of signatures:

- Block 11 is a panel member certification. Signatures here certify that a thorough analysis of potential hazards and risk mitigation measures (if necessary) was conducted. They do not indicate concurrence with the overall findings of the SRM panel.
- Block 12 is certification by the airport sponsor. This signature indicates acknowledgement of the risk and mitigation findings of the SRM panel. Airport sponsors must maintain safe airport operations under Federal grant assurances and obligation and the panel findings do not relieve the sponsor of any legal obligations in that regard.
- Block 13 is the FAA SRM approval. This signature indicates that the SRM process complies with FAA Order 5200.11, and that mitigation measures, if any, are included in the formal FAA approval action. The signature level is determined by the initial risk found by the SRM panel.

4. AIRPORT SYSTEM FEATURES

An airport system description is an important first step in the hazard identification process. It often places boundaries on the analysis to keep the panel focused on the project scope. For this SRM panel, the scope of the project was strictly limited to airfield configuration changes needed to decouple the runway ends to prevent situations where pilots might line up on the wrong runway. The panel did discuss other issues such as Threshold Siting Surface (TSS) criteria, potential development of an apron in the vicinity of taxiways E1 and K, and other airfield improvements needed to address other Hot Spot issues. However, the primary discussions of this panel were limited to Hot Spot #1 only and assumed that other airfield improvements and projects would be evaluated and developed with the Hot Spot #1 changes already in place.

Albuquerque is a medium-hub commercial service airport. The airfield is owned and operated by the City of Albuquerque – Department of Aviation. Kirtland Air Force Base (KAFB) is adjacent to the airfield, shares the runways, and provides ARFF services. It accommodates significant general aviation, cargo and military operations in addition to commercial service. Runway 8-26 is 13,793 feet long with a 1,000-foot displaced landing threshold to Runway 8. This is the primary commercial service runway and the length is necessary to meet aeronautical demand. Runway 12-30 is 6,000 feet in length and is the general aviation runway. It also accommodates military C-130 operations. An analysis presented in the SAMP indicates that 6,000 feet should be maintained if feasible, however, a length of 5,500 feet would still accommodate the vast majority of general aviation aircraft utilizing the runway.

5. SRM PANEL MEETING

The SRM panel meeting was held on December 15 and 16, 2015 in the ABQ Terminal Building Aviation Department Main Conference Room. The meeting was attended by representatives of ABQ, the planning consultant, FAA Air Traffic Control, FAA Airports, the state of New Mexico, and airport fixed base operators

Atlantic Aviation and Cutter Aviation. The meeting also provided remote access for some participants using GoToMeeting. The draft agenda and attendance list is included as Appendix C. The meeting began with an SAMP overview by Coffman Associates and an introduction to the FAA Safety Assessment process. Next, the panel began a detailed examination of each alternative in order: **1A**, **1B**, **1C**, **2**, and **3**.

The panel brainstormed potential hazards for each alternative. Hazards are defined by FAA as "any existing or potential condition that can lead to injury, illness, or death to people; damage to or loss of a system, equipment, or property; or damage to the environment." Many of the hazards identified by the panel are actually causes of a hazard. For example, a wide taxiway intersection can be the cause of a loss of situational awareness. In this case, loss of situational awareness is the hazard. This report reorganizes the hazard descriptions in this manner.

5.1 Eliminating Alternatives 1A and 3

After reviewing the alternatives with the planning team, the panel elected not to evaluate hazards and risks associated with alternatives **1A** and **3**. The panel believes that these alternatives are not feasible and received concurrence from the ABQ planning team and the FAA Project Manager.

Alternative **1A** (Figure 2) essentially removes a section of pavement beyond the threshold and replaces it with a short 90 degree entrance taxiway leading to the threshold. Although this option would successfully decouple the runways, the new taxiway would intersect with and complicate the existing intersection with Taxiways E1, E, and G. One of the objectives of the FAA RIM program is to eliminate confusing airfield geometry such as taxiway intersections with more than 3 nodes. This alternative would result in a taxiway with 4 nodes. The panel believes that any risk reduction associated with pavement removal beyond the runway threshold would be more than offset by the confusing taxiway intersection.

Alternative **3** retains all of the hazards identified for alternative **2** while failing to provide minimum runway length requirements for the majority of general aviation aircraft. (Paragraph 4 provides a discussion of length requirements for runway 12/30.) In addition, a shortened runway might lead to increased use of the main runways that could introduce new hazards into the system.

5.2 Alternatives 1B, 1C, and 2

The panel completed a thorough Comparative Safety Assessment (CSA) for alternatives **1B**, **1C** and **2**. Like all Safety Assessments, the panel identified potential hazards for each alternative. A hazard alignment process identified hazards that apply to multiple alternatives. This process also helped clarify and refine hazard descriptions to ensure a thorough analysis. Table 1 presents the list of hazards identified by the panel and the alternatives they impact. Identified hazards are discussed in section 6 of this report.

Table 1- Alignment of Hazards with Alternatives.

ID	Hazard	Alt 1B	Alt 1C	Alt 2
ABQ-107-1	Loss of situational awareness for pilots and vehicle operators	√		
ABQ-107-2	Shortened runway for Rwy 30 arrivals and departures	√	√	√
ABQ-107-3	Inadequate wingtip clearance at the proposed hold bars for Runway 08 and Runway 12	√		
ABQ-107-4	Increased Airfield Congestion		√	
ABQ-107-5	Loss of maintenance run-up area south of Twy G		√	
ABQ-107-6	Loss of Rwy 30 exit at Twy E		√	√
ABQ-107-7	Increased airfield congestion; increased runway crossings		√	√
ABQ-107-8	Twy A1 hold position			√

Appendix B is the completed HAW. The risk analysis for each hazard began by developing a consensus for the outcome/severity for each hazard. Because the severity measure of risk is not likely to change across multiple alternatives, it becomes a starting point for the CSA. The panel then determined outcome likelihood and initial risk level for each alternative, followed by mitigation measures if necessary. For this Safety Assessment, several hazards resulted in an initial risk level of **Medium**. According to FAA guidance, medium risk levels are the minimum acceptable and are normally controlled or mitigated and tracked to ensure risks remain acceptable throughout the life of the improvement. Often, the mitigation measures include potential airport design changes. The panel recognizes that these changes will need to be thoroughly evaluated by the airport planning team before they are proposed on the final ALP submittal.

5.3 Modifications to Alternative 1A

During the initial presentation of alternatives, some panel members suggested that Alternative 1A could be improved if the new entrance taxiway at the end of the runway was eliminated. This modification would eliminate the complex intersection previously identified for Alternative 1A. The panel decided to consider this change as a parking lot item at the conclusion of the panel deliberations. This modification would use Taxiway E as the primary entrance taxiway for aircraft departing on Runway 12 (See Figure 2). It would require aircraft to back-taxi about 350 ft. to use the full length of the runway for departures. Back taxi operations might be rare since Runway 12 is lightly used for departures. It would take advantage of the existing Taxiway E intersection as a “high speed” exit. It would also simplify taxiway signage in the area. However, the panel identified safety concerns that would offset these advantages:

- The time required to back taxi would increase the risk of a conflict with other aircraft arriving on Runway 12 as well as Runway 08
- It is not a standard airport configuration. Parallel taxiways normally provide an entrance at the end of the runway
- Back taxi operations are not commonly used at ABQ

In the end, the panel believes that this is not a viable option because any improvements to the operation would be offset by new hazards and risks.

5.4 Line up and wait

FAA Air Traffic Control (ATC) has already implemented operational controls that are meant to minimize or eliminate the risk of aircraft lining up on the wrong runway for departure. The procedure implements an instruction for pilots to line up and wait (LUAW) before departing Runway 08 or 12. LUAW is standard ATC terminology that instructs pilots to enter a runway and to wait for departure clearance. It provides ATC and the pilot with enough time to verify that the aircraft is on the correct runway. ATC believes that this is an effective mitigation measure that effectively decouples the two runways. ATC may continue to support the LUAW procedures as the most viable option after reviewing the findings of the panel in this report.

6. HAZARD ASSESSMENTS

The panel identified 8 hazards that are applicable to the alternatives **1B**, **1C**, and **2**. Each is included on the Hazard Assessment Worksheet, Appendix B. Where applicable, resulting risk levels are plotted on an FAA Predictive Risk Matrix in Figure 7.

ABQ-107-1 Loss of situational awareness for pilots and vehicle operators

This hazard only applies to Alternative 1B (Figure 3). The panel identified three causes for this hazard related to the new intersection created by four separate taxiways: E1, E, G, and the new entrance taxiway: (1) Introduction of an additional taxiway node; (2) Wide pavement in the taxiway intersection, and (3) Non-standard placement of signs caused by the wide intersection

ABQ-107-1a. Multiple node taxiway intersection

FAA Advisory Circular 150/5300-13A, Airport Design, recommends a standard taxiway intersection that complies with the “three-node” concept, meaning that a pilot is presented with no more than three choices at intersections- left, right, and straight ahead. This arrangement keeps taxiway intersections simple and allows for proper placement of airfield markings, signage and lighting. This hazard adds a fourth node to the intersection.

Assessment: This hazard cause could lead to a loss of situational awareness for pilots who might cross the wrong runway and contribute to a runway incursion. However, the panel believes that the likelihood of a runway incursion is reduced compared to the existing configuration because the new taxiway would be the only way to access the runway 12 threshold. Therefore the final risk level is judged to be **Low**. If this alternative is selected, in pavement taxiway signs would be needed to provide pilots with positive feedback. The panel also believes that the conversion of Taxiway E1 south of Taxiway G to a non-movement area ramp would eliminate the fourth node and thereby eliminate this hazard altogether.

ABQ-107-1b. Wide pavement at taxiway intersection

Wide pavement sections can often require placement of taxiway and other guidance signs at a great distance from the pilot.

Assessment: The panel noted that this hazard cause exists today as shown by Figure 2. Although the potential outcome is an aircraft moving onto the wrong taxiway, the panel noted that there is no history of this kind of incident at the airport. Therefore, the likelihood is judged to be **Extremely Remote** and the risk as **Low**. The hazard mitigation measure are the same as hazard-cause (a) above.

ABQ-107-1c. Non-standard placement of signs caused by the wide taxiway intersection

This hazard cause recognizes the compounding issues that accrue with complex, non-standard taxiway intersections. The unusual arrangement of taxiways at the E1-E-G intersection (Figure 2) can result in a wide expanse of pavement, which in turn creates difficulties in finding an effective locations of the guidance signs. The result is the increased possibility of loss of situational awareness by the pilot and an increased risk of a runway incursion or movement in the wrong direction on a taxiway. Note that the standard (left side) placement of a guidance sign for aircraft heading west on Taxiway E would be over 200 ft from the cockpit.

Assessment: The panel recognized the similarities with hazard-cause (a) and confirmed the resulting risk level to be **Low**.

ABQ-107-2 Shortened runway for Runway 30 arrivals and departures

According to the panel, Runway 30 is heavily used by general aviation and military aircraft for arrivals and departures. Alternatives **1B**, **1C** and **2** shorten the runway by 75ft, 150ft, and 350ft respectively. Two outcomes or effects were considered by the panel:

- An increased likelihood of an overrun (ABQ-107-4).
- Aircraft that normally use runway 30 would be required to use the remaining two runways at ABQ. The result would be creased complexity of airfield operation and controller workload (ABQ-107-4a).

Assessment, ABQ-107-2a: Aircraft departing or arriving on runway 30 will have shorter runway length than existing and therefore may experience an overrun for aborted takeoff runway and for long landings. Published runway lengths are the primary control that allow pilots to consider aircraft performance characteristics when deciding to use the runway. The effects or outcome of this hazard are greater than existing because each alternative would remove pavement beyond the published runway end and would therefore increase the likelihood of minor aircraft damage should an overrun actually occur. However likelihood of an overrun were judged to be only slightly greater than existing and the resulting risk was rated as **Low** for all three alternatives. In order to maintain severity of the outcome at existing levels, the panel identified a mitigation measure that would retain the pavement beyond the end of the runway by marking it with green paint or by marking it as a blast pad.

Assessment: ABQ-107-2b: This outcome would increase the workload of the controllers because more aircraft with differing performance characteristics would be using the remaining two runways. The panel judged the outcome severity to be Minor based on the severity classification matrix for ATC services (loss of separation resulting in a Category C Runway Incursion or Operational Error). Likelihood for this

outcome increases as runway length is shortened and fewer aircraft use Runway 30. Using this criteria, the panel judged the likelihood for Alternatives 1B and 1C to be Remote, but assigned an increased likelihood of **Probable** for Alternative 2. Therefore, Alternatives 1B and 1C have a risk level of Low and Alternative 2 has a risk level of **Medium**. Although the panel recommends pilot briefings and runway length signs for all three alternatives, it does not believe the risk level for Alternative 2 can be lowered below **Medium**. Therefore, the panel does not recommend implementation of Alternative 2.

ABQ-107-3 Inadequate wingtip clearance caused by the distance between aircraft holding at the Runway 08 and the new entrance taxiway

This hazard only applies to Alternative 1B as shown in Figure 3. There does not appear to be enough wingtip clearance for aircraft that are holding at the relocated hold line for Runway 08 and the new hold line for the Runway 12 threshold taxiway. For example, an aircraft holding for a Runway 12 departure might create a hazard for aircraft using the new threshold taxiway for a runway 12 departure. The same might be true if an aircraft is holding for a Runway 8 departure while another is approaching the Runway 08 hold line.

Assessment: Although wingtip strikes are not credible, increased controller workload could introduce a **Minimal** severity for this hazard. The panel identified airport design standards as a control that would eliminate this hazard and is recommending that the design fully comply with proper clearances. The resulting risk for this hazard is **Low**.

ABQ-107-4 Increased airfield congestion

Alternative 1C is the only alternative that proposes a closure to Taxiway E1. It would eliminate one of two access routes to and from the runways at ABQ. However, the closure of Taxiway E1 can be applied to any of the remaining alternatives and the resulting hazards and risks would remain the same. The panel identified two causes of this hazard:

ABQ-107-4a. Closing of Taxiway E1 for access to Runway 08 and 12

Assessment: Taxiways E1 and K comprise the key access routes for aircraft in the Cutter Aviation ramp area. This is a busy ramp and Taxiway K is often blocked by large aircraft maneuvering in this area. Currently, aircraft needing access to the runways during these periods can use either Taxiway E1 to the west or Taxiway K to the east. If E1 is unavailable and Taxiway K is blocked, aircraft will be forced to taxi around the blocking aircraft or be faced with an unplanned delay. The result would be increased airfield congestion, increased controller workload, and airfield delays. The panel rated this hazard severity as **Minor** and the likelihood as **Frequent** based on the amount of traffic handled by Cutter Aviation. The resulting risk level is **Medium**. The panel identified conversion of Taxiway E1 to a non-movement area and retaining the access to taxiways E, G, and A1 as the only mitigation that would reduce risk. Converting Taxiway E1 to non-movement would simplify taxi instructions and thereby lower the risk of a runway incursion in this area.

ABQ-107-4b. Loss of departure queue flexibility

With Taxiway E1 closed, there are fewer alternatives for queuing aircraft departing on runways 08 and 12.

Assessment: The intersection of runways 08 and 12 is a major activity center at ABQ. Elimination of flexibility to manage aircraft waiting to depart these runways or needing to access other parts of the airfield will increase controller workload, increase taxiway congestion, and will introduce new airfield delays. The panel rated the severity as **Major** based on the credibility of a serious runway incursion and likelihood as **Frequent** with a resulting **Medium** risk level. The only mitigation measure is to restore access to this area via Taxiway E1.

ABQ-107-5 Loss of maintenance run-up area south of Taxiway G

This hazard is related to hazard ABQ-107-4a. Aircraft use the wide pavement section in the Taxiway E1, G, and E intersection to perform maintenance run-up procedures. This operation is done without interfering with other aircraft in the area and provides a simpler alternative to taxiing to remote locations on the airfield. During the discussion of this hazard, the planning team recognized that the availability of a near-by maintenance run-up area is an essential design requirement and agreed to provide one into the final proposal. Therefore, this hazard was eliminated by the panel without a risk assessment.

ABQ-107-6 Loss of Runway 30 exit at Taxiway E

Alternatives 1B and 2 eliminate an exit taxiway for arrivals on Runway 30. The geometry of this intersection allows aircraft to leave the runway at a higher speed than would otherwise be possible with a 90-degree exit.

Assessment: This action would create an operational change at the airport. Aircraft normally using the Taxiway E exit would remain on the runway slightly longer and might interfere or interrupt landing operations on runways 30 and 26 (aircraft exiting at the end of Runway 30 would be within protected operational surfaces for Runway 26). Although the panel rated this as a **Low** risk hazard, they are recommending provisions in the final design for an expedited exit from Runway 30.

ABQ-107-7 Increased airfield congestion and runway crossings caused by complex taxi routes due to closing of west end of parallel Taxiway E

Alternatives 1C and 2 (Figures 4 and 5) eliminate the western most portion of Taxiway E. Taxiway E is a full parallel taxiway for Runway 08-24. It provides a standard taxiway configuration that facilitates the east-west movement of aircraft. This hazard applies to both Alternative 1C and Alternative 2.

Assessment: Aircraft routinely need navigate one end of Runway 08/26 to the other in the event of a change in landing operations and to accommodate other operational needs. Aircraft holding on Taxiway A1 (Figure 3) can be instructed to cross the approach of Runway 08 and then turn left on Taxiway E to proceed to the east end of the runway. With the western section of Taxiway E no longer available, taxiway instruction become much more complicated. This change would increase controller workload, increase taxiway congestion, contribute to a loss of situational awareness for pilots, and increase the likelihood of runway incursions. Runway incursions are a credible outcome for this hazard, so the panel rated the severity as **Major**. The resulting risk level is **Medium** as documented by the HAW. The panel identified the restoration of the full parallel taxiway for Alternative 1C as the only

feasible mitigation measure. However, this mitigation is not feasible for Alternative 2 because of conflicts with the Runway 12 threshold.

ABQ-107-8 Taxiway A1 hold position

As shown in Figure 5, the relocation of the Runway 12 threshold by 350 ft (Alternative 2) places the existing hold line on Taxiway A1 inside the threshold siting surface for Runway 12. This situation violates current airport design surfaces and requires the relocation of the hold position further from the Runway 08 threshold (towards the terminal). The planning team will develop a configuration that addresses this issue if Alternative 2 is selected. Therefore, the panel did not complete the risk assessment for this hazard.

Hazards with a completed risk assessment are plotted on the FAA Predictive Risk Matrix in Figure 8.

7. CONCLUSION

The SRM panel performed a complete hazard assessment on three alternatives and 11 hazards. The panel is recommending mitigation measures for all alternatives to ensure that risk remains at acceptable levels. Table 2 summarizes the findings of the panel.

Table 2-- Alternatives, Hazards, and Risk Levels

Alternative	Hazards Evaluated	Initial Risk	Residual Risk with Mitigation Measures in Place
1B	3	Low	Low
1C	2	Medium	Low
2	3	Medium	Medium

The panel does not recommend implementation of Alternative 2 because:

- The shortened runway would divert too many aircraft onto the remaining air carrier runways, increasing operational complexity, and increasing the likelihood of operational incidents or runway incursions.
- This alternative includes the closing of the western end of parallel taxiway E which cannot be restored as a mitigation because of conflicts with the new runway 12 threshold. Failure to restore a full parallel taxiway would result in complex taxi routes and taxi instructions which also raise the likelihood of runway incursions.

The panel carefully considered the complex nature of the Taxiway E1, G and E intersection. The wide pavement sections and unusual geometry can contribute to loss of situational awareness for pilots. Alternative 1B provides an improvement to this arrangement by closing the Taxiway E1 entrance into the intersection. While this action improves the intersection, it also adds new complexity to airfield operations elsewhere. Therefore, the panel included restoration of the Taxiway E1 access point as a mitigation measure. The remaining option for improving this intersection is the conversion of Taxiway E1 to a non-movement area ramp as shown on the HAW as a mitigation measure for hazards ABQ-107-1, 2, and 3. Under this

arrangement, aircraft would hold at the edge of the movement area on what is now Taxiway E1 before requesting clearance to proceed onto the airfield. This procedure would simplify taxi instructions and reduce the possibility of loss of situational awareness.

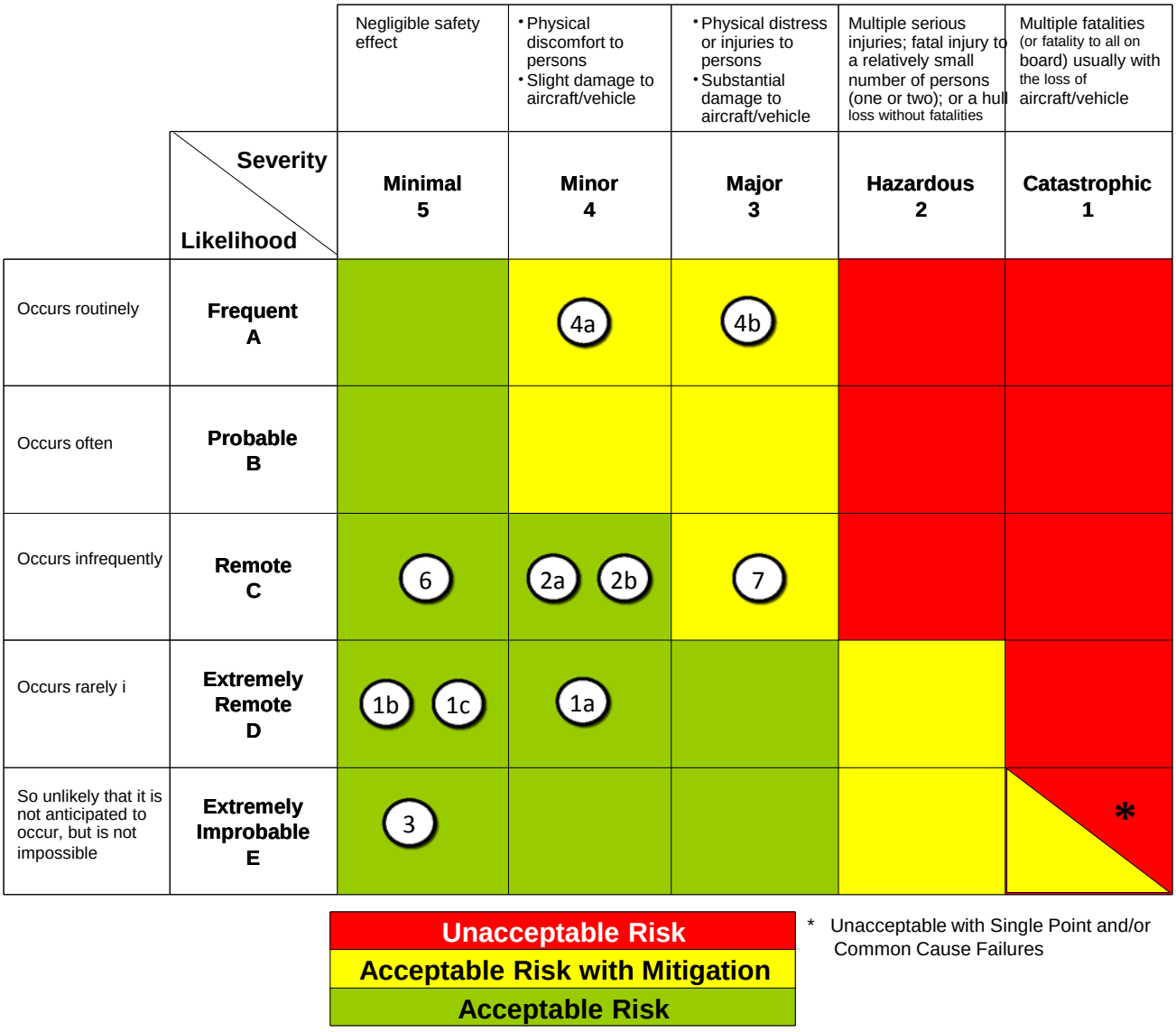


Figure 7. FAA Predictive Risk Matrix with Hazards

Comparative Safety Assessment

Airports Safety Risk Management (SRM)

Safety Assessment Screening for Projects (SAS-1) **Page 1**

1. Project Location

a. Locid	ABQ	**SMS ID:**	107
b. Airport	ALBUQUERQUE INTL SUNPORT		
c. City	ALBUQUERQUE		
d. State	NM		
e. Sponsor	City of Albuquerque		
f. Service Level	M		
g. CFR 139 Date	05/1973		
h. CFR 139 Type	I C S		

2. Describe the Proposed Action (Include any identifying number or date of submission (e.g., date of ALP))

Decoupling of runways 08 and 12 thresholds. The hold lines on Taxiway A1 and E1 are the hold lines for entry to both runways leading to the potential for a pilot to line up and takeoff from the wrong runway. This area is designated as "Hot Spot 1" on the FAA airport diagram. The proposed action is a revision to the Airport Layout Plan that reconfigures the runway thresholds and/or taxiways in this area to prevent this confusion. The airport is considereing several alternatives to mitigate this hot spot.

3. Approval Action Type/Triggering Event (Select all that apply)

- **a.** ☑ Airport Layout Plan (ALP) (new or update)
- **b.** ☐ Airport construction review, coordination, and approval
- **c.** ☐ Other airport changes not involving construction
- **d.** ☐ Part 150 Noise Compatibility Program (measures that may affect aviation safety)

4. Project Screening

- **a.** ○ A preliminary analysis indicates that an SRM review is required (Complete pages 2 & 3)
- **b.** ◉ The proposal does not require further SRM review (Discard pages 2 & 3)

Prepared by: Andy Velayos

Office: FAA Southwest Region, Airports Divisi Signature: _____

Title: Senior/Lead Program Manager Date: _____

Comparative Safety Assessment

Safety Assessment Screening for Projects (SAS-1) **Page 2**

SMS ID: 107

5. Was the proposal reviewed by OE/AAA?

a. ○ Yes ◉ No (Skip to block number 6)
b. Case Number: _____
c. Determination Date: _____
d. ☐ OE/AAA review comments attached.
e. ☐ OE/AAA review indicates an objection to the proposal.

6. A review of the proposal indicates the following: (Select all that apply)

ARP System Safety Impact Checklist

a. ☐ The Proposed Action may deviate from applicable FAA standards
b. ☑ The Proposed Action may increase aviation safety risks, with existing controls in-place
c. ☑ The Proposed Action may adversely affect aviation operations with existing controls in-place
d. ☑ The Proposed Action my affect navigational aids
e. ☑ The Proposed Action may impact TERPS surfaces
f. ☐ Other Safety Impact: _____

SRM Panel

g. ___ The OE/AAA review indicates that an SRM panel is required.
h. √ The Safety Impact Checklist indicates that an SRM panel is required

7. SRM Finding of No Increased Risk

The proposed action was reviewed with respect to known hazards and existing controls. Potential risks were evaluated with appropriate FAA personnel, airport operations, and other aviation officials with safety responsibilities. Based on this review, existing controls (including standard NOTAMS) will eliminate the probability of new risks being introduced into the aviation system. An SRM panel is not required.

Name and Title	Date	Signature
N/A		

8. SRM Panel and Findings

a. Report date: _____ **b.** ☐ Report attached

9. Initial Risk Determination

a. ◉ Low initial Risk. Attach supporting documentation.
b. ○ Medium Initial Risk. Attach detailed explanation of hazards.
c. ○ High Initial Risk. Attach detailed explanation of hazards.
(Requires review by ARP Safety Review Board)

10. Final Risk Determination

a. ◉ Low Risk. Attach detailed explanation of mitigating measures, including NOTAM requirements.
b. ○ Medium Risk. Attach detailed explanation of mitigating measures, including NOTAM requirements.
c. ○ High Risk. The project proposal with risk mitigation in place is unacceptable.

Safety Assessment Screening for Projects (SAS-1) Page 3

SMS ID: 0

11. SRM Panel Members and Certification

We certify that we have reviewed the project documentation and have fully considered the potential hazards (and any proposed mitigation measures) before reaching this determination. Dissenting opinions concerning the determination are included in the report.

Name	Organization	Title	Date	Signature
Leonie San Miguel	ABQ ATCT	ATM	12/16/15	Leonie San Miguel
KEITH REEVES	ABQ ATCT	SS	12/16/15	K F. Reeves
Betsy Sutton	ABQ ATCT	PLM	12/16/15	Betsy Sutton
J. D. Huss	ABQ FSDO	ASI	12/16/15	J D Huss
Don L Schroeder	ABQ ATC / SS		12/16/15	
JANE LUCERO	NMDOT-AD	Airport Dev. Admn.	12/16/15	Jane M Lucero
Jessi Rowden	Cutter Aviation	General Mgr	12/16/15	Jessi Rowden
[illegible]	ANM Vol ATCS LA/NM ADO	PM	12/16/15	

12. Airport Certification and Acceptance

As a duly authorized representative of the sponsor of the airport identified above, I hereby certify that I have reviewed and understand the hazards and mitigation measures identified in the attached documentation. I further certify that I understand it is our legal duty, as sponsor, to ensure that any and all airport-related mitigation measures are fulfilled and documented in a timely manner. Any such commitments on our part represent an obligation under our Federal grant assurances, regardless of whether the FAA participates in the funding of any part of the Proposed Action. Nothing in the FAA's review may be deemed as relieving the sponsor of its legal obligations as owner and operator of the airport.

Name and Title	Date	Signature

13. FAA SRM Approval

Hazards were identified and analyzed using standard procedures and processes in accordance with FAA Order 5200.11. Mitigation measures, including draft NOTAM requirements, if necessary, are attached and are included with the formal FAA project approval action. These measures will help ensure safety levels are maintained at acceptable levels both during and after the proposed construction and non-construction airport changes.

Name and Title	Date	Signature

Comparative Safety Assessment

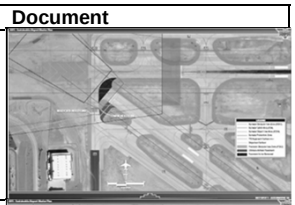
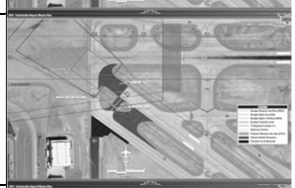
SMS ID: 107

Locid: ABQ **Airport:** ALBUQUERQUE INTL SUNPORT

Project Manager: Andy Velayos **City:** ALBUQUERQUE

Description: Decoupling of runways 08 and 12 thresholds. The hold lines on Taxiway A1 and E1 are the hold lines for entry to both runways leading to the potential for a pilot to line up and takeoff from the wrong runway. This area is designated as "Hot Spot 1" on the FAA airport diagram. The proposed action is a revision to the Airport Layout Plan that reconfigures the runway thresholds and/or taxiways in this area to prevent this confusion. The airport is considereing several alternatives to mitigate this hot spot.

ALTERNATIVES

ID	Name	Description	Document
1	**1A**	Remove in-line pavement to runway 12, but leave threshold in place; install new entrance taxiway	
2	**1B**	Relocate runway 12 threshold 75 ft and remove in-line pavement; install new entrance taxiway	
3	**1C**	Relocate runway 12 thresold 150 ft and remove in-line pavement. Also remove section of taxiway E to the west of runway 12; install entrance taxiway	
4	**2**	Relocate runway 12 thresold 350 ft and remove in-line pavement. Also remove section of taxiway E to the west of taxiway E3; establish new entrance taxiway for runway 12	
5	**3**	Relocate runway 12 thresold 1000 ft and remove in-line pavement. Also remove remaining section of taxiway E to the west of taxiway E3; Install new entrance taxiway	

Comparative Safety Assessment

SMS ID: 107 **Airport:** ALBUQUERQUE INTL SUNPORT
Locid: ABQ **City:** ALBUQUERQUE
Project Manager: Andy Velayos

Description: Decoupling of runways 08 and 12 thresholds. The hold lines on Taxiway A1 and E1 are the hold lines for entry to both runways leading to the potential for a pilot to line up and takeoff from the wrong runway. This area is designated as "Hot Spot 1" on the FAA airport diagram. The proposed action is a revision to the Airport Layout Plan that reconfigures the runway thresholds and/or taxiways in this area to prevent this confusion. The airport is considereing several alternatives to mitigate this hot spot.

1 **Hazard ID**	2 **Hazard Description**	3 **Causes**	4 **System States**	5 **Effects**	6 **Severity**	7 **Severity Rationale**	8 **Existing Controls**	9 **1B**	9 **1C**	9 **2**
ABQ-107-1a	LOSA for pilots and vehicle operators	Multiple node Twy intersection	Itinerant and ground operations	Pilot deviation (RI): crossing wrong runway; go-arounds; increased controller communications	Minor	No history of **greater** than C RI; no collisions; improved separations over existing	ATC; pilot/driver awareness training (briefings, etc)	Likelihood: Extremely remote- less likely than existing **Risk: Low** Mitigation: In-pavement signs; convert Twy E1 south to ramp (eliminates a node)	N/A	N/A
ABQ-107-1b		Wide pavement at Twy intersection	Itinerant and ground operations	Increased controller communications; wrong direction on taxiway	Minimal	No history; minimal disruption of airport operations	ATC; pilot/driver awareness training (briefings, etc)	Likelihood: Extremely remote- less likely than existing **Risk: Low** Mitigation: In-pavement signs; convert Twy E1 south to ramp	N/A	N/A
ABQ-107-1c		Non-standard placement of signs caused by the wide Twy intersection	Itinerant and ground operations	Increased controller communications; wrong direction on taxiway	Minimal	No history; minimal disruption of airport operations	ATC; pilot/driver awareness training (briefings, etc)	Likelihood: Extremely remote- less likely than existing **Risk: Low** Mitigation: In-pavement signs; tightening Twy fillets; convert Twy E1 south to ramp	N/A	N/A
ABQ-107-2a	Shortened runway for Rwy 30 arrivals and departures	Aircraft performance	All operations	Overrun	Minor	Aircraft damage for minor overrun	Published runway length	Likelihood: Remote-slight increase over existing **Risk: Low** Mitigation: Paint existing pavement or convert to blast pad/overrun	Likelihood: Remote-slight increase over existing **Risk: Low** Mitigation: Paint existing pavement or convert to blast pad/overrun	Likelihood: Remote-slight increase over existing **Risk: Low** Mitigation: Paint existing pavement or convert to blast pad/overrun
ABQ-107-2b			All operations	Increased complexity of airport operations; mixing aircraft types	Minor	Increased controller workload and increased traffic load to remaining runways	ATC; published runway length; airport diagram	Likelihood: Remote **Risk: Low** Mitigation: Pilot briefings; Runway length signs	Likelihood: Remote **Risk: Low** Mitigation: Pilot briefings; Runway length signs	Likelihood: Probable **Risk: Medium** Mitigation: Pilot briefings; Runway length signs (Not recommended by the SRM panel due to significant Rwy loss, residual risk remains medium)
ABQ-107-3	Inadequate wingtip clearance	Clearance between aircraft holding at the Rwy 08 and the new entrance taxiway holdline	All operations	Increased controller workload (wingtip strikes not credible)	Minimal	Design and operational constraints	ATC; pilot awareness; airport design standards	Likelihood: Extremenly improbable **Risk: Low** Mitigation: Design for proper clearances	N/A	N/A

Comparative Safety Assessment

1 **Hazard ID**	2 **Hazard Description**	3 **Causes**	4 **System States**	5 **Effects**	6 **Severity**	7 **Severity Rationale**	8 **Existing Controls**	9 **1B**	9 **1C**	9 **2**
ABQ-107-4a	Increased airfield congestion	Closing of Twy E1 for access to Rwys 08 & 12	All operations with Twy K closed due to parked aircraft	Increased controller workload; Increased taxiway congestion; inadequate airfield access; airfield delays	Minor	Significant disruption to airport operations	ATC	N/A	Likelihood: Frequent-Ramp activity **Risk: Medium** Mitigation: Convert E1 to ramp (non-movement area) and leave access point open	N/A
ABQ-107-4b		Loss of departure queue flexibility	All operations	Increased controller workload; Increased taxiway congestion; inadequate airfield access; airfield delays	Major	Significant disruption to airport operations; potential delays	ATC		Likelihood: Frequent **Risk: Medium** Mitigation: Maintain ramp area at E1	
ABQ-107-5	Loss of maintenance run-up area south of Twy G (eliminated as hazard, run-up area will be maintained)	Increased airfield congestion; increased runway crossings increased frequency congestion; increased runup operations on ramp	Nighttime operations							
ABQ-107-6	Loss of Rwy 30 exit at Twy E	Loss of 'high speed' exit capabilities	Landing operations on Rwy 30	Slower, less trimely runway exit; possible go-arounds and interference with Rwy 26 operations	Minimal	Go-around on Rwy 30 would intersectin Rwy 26 departures	ATC		Likelihood: Remote **Risk: Low** Mitigation: Provide high-speed, non-standard exit taxiway	Likelihood: Remote **Risk: Low** Mitigation: Provide high-speed, non-standard exit taxiway
ABQ-107-7	Increased airfield congestion; increased runway crossings	Complex taxi routes due to closing of west end of parallel Twy E	Daily operations	Increased controller workload; Increased taxiway congestion; inadequate airfield access; airfield delays; runway incursions	Major	Pilot workload; complex taxi instructions	ATC; Existing parallel taxiway E simplifies taxi routes		Likelihood: Remote **Risk: Medium** Mitigation: Restore full parallel Twy E	Likelihood: Remote **Risk: Medium** Mitigation: None feasible (Not recommended by the SRM panel due conflicts with Rwy 12 threshold)
ABQ-107-8	Twy A1 hold position (violates design standards, will be corrected, hazard eliminated for risk assessment)	Increased taxi/departure time	Daily operations	Increased controller workload; increased delays; go-around	Minimal	Minimal reduction of ATC services	ATC			

Albuquerque International Sunport
Runway 08 and 12 Threshold Decoupling
Safety Risk Management Panel Meeting: December 15-16, 2015

DRAFT Agenda

Location: ABQ Aviation Department's main conference room (top floor of terminal buildings on the east side of the escalators)

December 15	
1:00 pm	Welcome and Introductions
1:30 pm	Project Overview and Master Plan Status (Coffman Associates)
2:30 pm	FAA Safety Assessment Process (Ken Jacobs)
3:30 pm	Break
3:45 pm	Alternative 1B: Hazard Identification
5:00 pm	Adjourn
December 16	
8:00 am	Recap from previous day
8:30 am	Alternative 1C: Hazard Identification
9:30 am	Alternative 2: Hazard Identification
10:00 am	Break
10:15 pm	Alternative 3: Hazard Identification
10:30 am	Hazard Alignment: Identify hazards that apply to multiple alternatives
11:00 am	Risk Analysis and Mitigation Measures for Alternative 1B
12:00 pm	Lunch Break: On your own
1:00 pm	Risk Analysis and Mitigation Measures for Alternatives 1C, 2, and 3. Complete Hazard Assessment Worksheet
2:00 pm	Wrap up and SAS signatures
2:30 pm	Adjourn

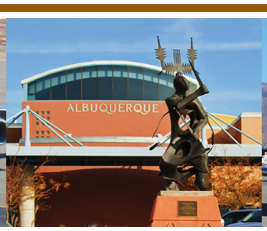
SRM Sign-In Sheet: Albuquerque Sunport					
#	Name	Phone Number	Email Address	Day 1 Dec 15, 2015	Day 2 Dec 16, 2015
1	Leonie San Miguel	505-856-4901	leonie.sanmiguel@faa.gov	✖	✖
2	Betsy Sutton	505-856-4935	betsy.sutton@faa.gov	✖	✖
3	JD Huss	505-764-1221	jd.huss@faa.gov	✖	✖
4	Don L. Schroeder	505-856-4910	don.l.schroeder@faa.gov	✖	✖
5	Sammy Lockwood	505-934-9101	sam.lockwood@natca.net	✖	✖
6	Jimmy Chavez	505-366-8341	lostcrow2716@gmail.com	✖	✖
7	Steven Marruffo	505-842-4990	steven.marruffo@atlanticaviation.com	✖	✖
8	Jim Hinde	505-244-7725	jhinde@cabq.gov	✖	✖
9	Jane Lucero	505-244-1788	jane.lucero@state.nm.us	✖	✖
10	Mike Provine	505-242-5700	mprovine@molzencorbin.com	✖	✖
11	Steve Benson	816-524-3500	sbenson@coffmanassociates.com	✖	
12	Jessi Rowden	505-842-4184	jrowden@cutteraviation.com	✖	✖
13	Keith Reeves	505-856-4918	keith.reeves@faa.com	✖	✖
14	Andy Velayos	817-222-5647	andy.velayos@faa.gov	✖	✖
15	Patrick Taylor	816-524-3500	ptaylor@coffmanassociates.com	✖	✖
16	Gil Neumann	817-222-5627	gil.neumann@faa.gov	✖	✖
17	Larry Allen	972-615-2532	larry.f.allen@faa.gov	✖	✖
18					
19					
20					
21					
22					
23					
24					
25					

Appendix G

ALP SET

ABQ INTERNATIONAL SUNPORT

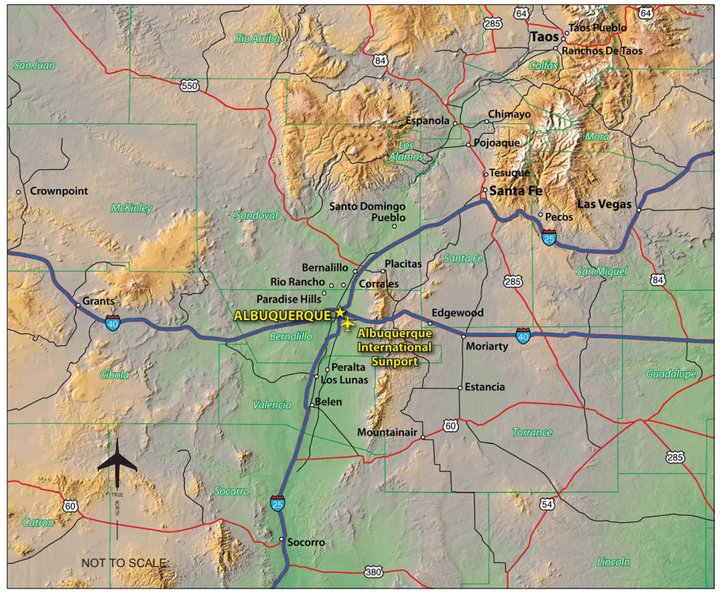
Sustainable Airport Master Plan



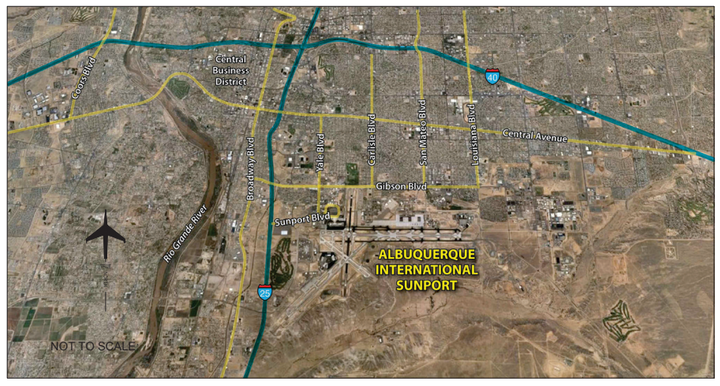
AIRPORT LAYOUT PLAN
FOR
ALBUQUERQUE INTERNATIONAL SUNPORT
ALBUQUERQUE, NEW MEXICO

Prepared for the
City of Albuquerque

LOCATION MAP



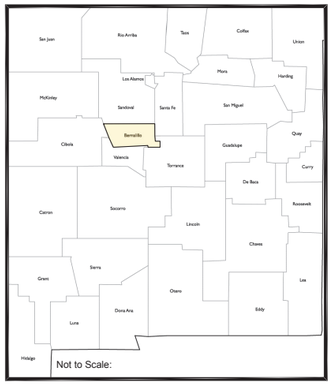
VICINITY MAP



INDEX OF DRAWINGS

1. TITLE SHEET
2. AIRPORT DATA
3. EXISTING AIRPORT LAYOUT PLAN DRAWING
4. ULTIMATE AIRPORT LAYOUT PLAN DRAWING
5. AIRPORT AIRSPACE DRAWING PART 77 CONICAL SURFACE
6. AIRPORT AIRSPACE DRAWING PART 77 RUNWAY 8 APPROACH
7. AIRPORT AIRSPACE DRAWING PART 77 RUNWAY 3 APPROACH
8. RUNWAY 8-26 PART 77 APPROACH SURFACE PROFILES
9. RUNWAY 8 PART 77 (40:1) APPROACH SURFACE PROFILE
10. RUNWAY 3-21 PART 77 APPROACH SURFACE PROFILES
11. RUNWAY 3 PART 77 (40:1) APPROACH SURFACE PROFILE
12. RUNWAY 12-30 PART 77 APPROACH SURFACE PROFILES
13. INNER PORTION OF RUNWAY 8-26 APPROACH SURFACE DRAWING
14. INNER PORTION OF RUNWAY 3-21 APPROACH SURFACE DRAWING
15. INNER PORTION OF RUNWAY 12-30 APPROACH SURFACE DRAWING
16. AIRLINE TERMINAL AREA DRAWING
17. SOUTH GENERAL AVIATION / AIR CARGO AREA DRAWING
18. ON-AIRPORT LAND USE DRAWING
19. RUNWAY 8-26 DEPARTURE SURFACE DRAWING
20. RUNWAY 3-21 DEPARTURE SURFACE DRAWING
21. RUNWAY 12-30 DEPARTURE SURFACE DRAWING
22. AIRPORT PROPERTY DATA
23. AIRPORT PROPERTY MAP EXHIBIT A

County Map



FAA APPROVAL STAMP

FEDERAL AVIATION ADMINISTRATION
Southwest Region
APPROVED
Approved - Subject to Conditions
in FAA Letter Dated: 8/21/2019
3/20/2019 Date
Manager, LA/NM ADO, ASW-610

FOR APPROVAL BY:

Nyika A. Allen
Director
3/15/19
DATE:

0 100 200 300
SCALE IN FEET

GENERAL NOTES:

This airport layout drawing (ALD) plan set was prepared in accordance with FAA Advisory Circular 150/5070-6, Airport Master Plans, and identifies the current conditions and future needs of Albuquerque International Sunport Airport, the study which was finalized in August 2018. At the time of this study, the critical aircraft is a MD83/88, B767-300, ADG D-IV.

Date of Mapping: 12/14/2009
Date of Obstruction Survey: 7/13/2010

Supplemental Data Provided By:

..\COFFMAN\Molzen logo.jpg

No.	REVISIONS	DATE	BY	APP'D

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

TITLE SHEET

Albuquerque, New Mexico

PLANNED BY:	Patrick C. Taylor
DETAILED BY:	Larry D. Johnson
APPROVED BY:	Steven G. Benson, P.E.
August 21, 2018	SHEET 1 OF 23

Coffman Associates
Airport Consultants
www.coffmanassociates.com

02/26/19 - 9:38am - ljohnson - R:\CAD\Johnson\Projects\abq-2018\ALP\ABQ-alt1_Cover.dwg

RUNWAY DATA

	RUNWAY 8-26				RUNWAY 3-21				RUNWAY 12-30			
	EXISTING		ULTIMATE		EXISTING		ULTIMATE		EXISTING		ULTIMATE	
RUNWAY IDENTIFICATION	RUNWAY 8	RUNWAY 26	RUNWAY 8	RUNWAY 26	RUNWAY 3	RUNWAY 21	RUNWAY 3	RUNWAY 21	RUNWAY 12	RUNWAY 30	RUNWAY 12	RUNWAY 30
APPROACH REFERENCE CODE (APRC)	D/IV/1600, D/V/2400		D/IV/1600, D/V/2400		D/IV/1600, D/V/2400		D/IV/1600, D/V/2400		B/III/VIS, D/II/VIS		B/III/5000, D/II/5000	
DEPARTURE REFERENCE CODE (DPRC)	D/IV, D/V		D/IV, D/V		D/IV, D/V		D/IV, D/V		B/III, D/II		B/III, D/II	
RUNWAY DESIGN CODE (RDC)	D-IV-2400		D-IV-2400		D-IV-2400		D-IV-2400		B-III-VIS		B-III-5000	
DESIGN CRITICAL AIRCRAFT	D-IV-5		D-IV-5		D-IV-5		D-IV-5		B-III-4		B-III-4	
MAX. CERTIFIED TAKEOFF WEIGHT OF DESIGN A/C	412,000 lbs		412,000 lbs		412,000 lbs		412,000 lbs		64,500 lbs		64,500 lbs	
RUNWAY WIND COVERAGE (16 KNOTS)	97.70%		97.70%		95.69%		95.69%		97.42%		97.42%	
RUNWAY DIMENSIONS (L x W)	13,788' x 150'		13,788' x 150'		9,997' x 150'		11,000' x 150'		5,998' x 150'		5,400' x 100' [4]	
RUNWAY SHOULDER WIDTH	35'		35'		25'		25'		20'		20'	
RUNWAY BEARING (True Bearing)	90.6384° / 270.6384°		90.6384° / 270.6384°		45.0053° / 225.0053°		45.0053° / 225.0053°		129.0619° / 309.0619°		129.0619° / 309.0619°	
RUNWAY LIGHTING	HIRL, TDZE, C/L		HIRL, TDZE, C/L		HIRL, TDZE, C/L		HIRL, TDZE, C/L		MIRL		MIRL	
RUNWAY APPROACH LIGHTING	MALSR	None	MALSR	None	MALSR	None	MALSR	None	None	None	None	None
TYPE OF AERONAUTICAL SURVEY REQUIRED	VG	VG	VG	VG	VG	VG	VG	VG	NVG	NVG	NVG	NVG
PRECISION OBJECT FREE ZONE (200' x 800')	Yes	N/A	Yes	N/A	Yes	N/A	Yes	N/A	N/A	N/A	N/A	N/A
RUNWAY BLAST PAD	520' x 220'	1000' x 225'	520' x 220'	1000' x 225'	401' x 221'	None	None	None	None	None	None	None
RUNWAY LINE OF SIGHT REQUIREMENT MET	Yes		Yes		Yes		Yes		Yes		Yes	
RUNWAY EFFECTIVE GRADIENT / MAXIMUM GRADIENT	0.312%		0.312%		0.110%		0.101%		0.00%		0.00%	
RUNWAY LOW POINT (NAVD 88)	5311.8' MSL		5311.8' MSL		5305.0' MSL		5305.0' MSL		5312.0' MSL		5312.0' MSL	
RUNWAY MAXIMUM ELEVATION / HIGH POINT (NAVD 88)	5354.9' MSL		5354.9' MSL		5316.2' MSL		5316.2' MSL		5316.1' MSL		5316.1' MSL	
RUNWAY PAVEMENT SURFACE MATERIAL	Concrete/Asphalt		Concrete/Asphalt		Concrete		Concrete		Concrete		Concrete	
RUNWAY PAVEMENT SURFACE TREATMENT	Grooved		Grooved		Grooved		Grooved		Grooved		Grooved	
RUNWAY PAVEMENT STRENGTH (in thousand lbs.) [1]	100(S), 210(D), 360(2D), 720(2D/2D2)		100(S), 210(D), 360(2D), 720(2D/2D2)		100(S), 210(D), 360(2D), 720(2D/2D2)		100(S), 210(D), 360(2D), 720(2D/2D2)		65(S), 120(D))		65(S), 120(D)	
RUNWAY PAVEMENT STRENGTH (PCN)	71/R/B/W/T		71/R/B/W/T		78/R/B/W/T		78/R/B/W/T		41/R/C/W/T		41/R/C/W/T	
14 CFR PART 77 APPROACH SURFACES	1,000' x 50,000' x 16,000' (8) 1,000' x 10,000' x 3,500' (26)		1,000' x 50,000' x 16,000' (8) 1,000' x 10,000' x 3,500' (26)		1,000' x 50,000' x 16,000' (3) 1,000' x 10,000' x 3,500' (21)		1,000' x 50,000' x 16,000' (3) 1,000' x 10,000' x 3,500' (21)		500' x 5,000' x 1,500' (12) 500' x 5,000' x 1,500' (30)		500' x 5,000' x 1,500' (12) 500' x 10,000' x 3,500' (30)	
RUNWAY PROTECTION ZONE	1000' x 2500' x 1750' (8) 500' x 1700' x 1010' (26)		1000' x 2500' x 1750' (8) 500' x 1700' x 1010' (26)		1000' x 2500' x 1750' (3) 500' x 1700' x 1010' (21)		1000' x 2500' x 1750' (3) 500' x 1700' x 1010' (21)		500' x 1000' x 700' (12) 500' x 1000' x 700' (30)		500' x 1000' x 700' (12) 500' x 1000' x 700' (30)	
RUNWAY CL TO PARALLEL TAXIWAY CENTERLINE	450' - 675' (Varies)		450' - 675' (Varies)		450'		450'		307' - 340' (Varies)		307' - 340' (Varies)	
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	129.5'		129.5'		129.5'		129.5'		93'		93'	
TAXIWAY SHOULDER WIDTH	30'		30'		30'		30'		20'		20'	
TAXIWAY EDGE SAFETY MARGIN	15'		15'		15'		15'		10'		10'	
TAXIWAY WIDTH (TDG)	75' (Varies)		75' (Varies)		75' (Varies)		75' (Varies)		75' (Varies)		75' (Varies)	
TAXIWAY LIGHTING	MITL		MITL		MITL		MITL		MITL		MITL	
TAXIWAY MARKING	Centerline, Signage, Holding Mrkg		Centerline, Signage, Holding Mrkg		Centerline, Signage, Holding Mrkg		Centerline, Signage, Holding Mrkg		Centerline, Signage, Holding Mrkg		Centerline, Signage, Holding Mrkg	
TAXIWAY SURFACE MATERIAL	Concrete/Asphalt		Concrete		Concrete		Concrete		Concrete		Concrete	
TAXIWAY AND TAXILANE SAFETY AREA WIDTH	171'		171'		171'		171'		118'		118'	
TAXIWAY AND TAXILANE OBJECT FREE AREA WIDTH	259' / 225'		259' / 225'		259' / 225'		259' / 225'		186' / 162'		186' / 162'	
TAXIWAY HOLDING POSITION MARKING/SIGN [2]	304' (Actual 250')		304' (Actual 250')		304' (Actual 250')		304' (Actual 250')		203'		203'	
14 CFR PART 77 APPROACH CATEGORY (Type Used)	Precision [PIR]	Nonprecision [C]	Precision [PIR]	Nonprecision [C]	Precision [PIR]	Nonprecision [C]	Precision [PIR]	Nonprecision [C]	Visual [BV]	Visual [BV]	Visual [BV]	Nonprecision [C]
14 CFR PART 77 APPROACH SLOPE	50:1/40:1	34:1	50:1/40:1	34:1	50:1/40:1	34:1	50:1/40:1	34:1	20:1	20:1	20:1	34:1
RUNWAY APPROACH VISIBILITY MINIMUMS (LOWEST)	1/2 mile	1 1/4 mile	1/2 mile	1 1/4 mile	1/2 mile	1 1/2 mile	1/2 mile	1 mile	Visual	Visual	Visual	1 mile
RUNWAY MARKING	Precision	Precision	Precision	Precision	Precision	Precision	Precision	Precision	Basic	Basic	Nonprecision	Nonprecision
RUNWAY END ELEVATION (NAVD 88)	5311.9' MSL	5354.9' MSL	5311.9' MSL	5354.9' MSL	5305.1' MSL	5316.1' MSL	5305.0' MSL	5316.1' MSL	5312.4' MSL	5313.6' MSL	5314.0' MSL	5313.6' MSL
RUNWAY THRESHOLD DISPLACEMENT	1000'	N/A	400'		None	None	None	None	None	None	None	None
RUNWAY DISPLACED THRESHOLD ELEVATION	5314.7' MSL	N/A	5313.1' MSL	None	None	None	None	None	None	None	None	None
RUNWAY TOUCHDOWN ZONE ELEVATION (NAVD 88)	5319.9' MSL	5354.9' MSL	5318.3' MSL	5354.9' MSL	5312.2' MSL	5316.2' MSL	5310.6' MSL	5316.2' MSL	5314.5' MSL	5316.1' MSL	5315.6' MSL	5316.1' MSL
THRESHOLD SITING REQUIREMENTS (AC 150/5300-13A)	34:1, Rwy Type 7	20:1, Rwy Type 5	34:1, Rwy Type 7	20:1, Rwy Type 5	34:1, Rwy Type 7	20:1, Rwy Type 5	34:1, Rwy Type 7	20:1, Rwy Type 5	20:1, Rwy Type 3	20:1, Rwy Type 3	20:1, Rwy Type 3	20:1, Rwy Type 4
RUNWAY DEPARTURE SURFACE (Yes / No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
RUNWAY SAFETY AREA (Standard Beyond Runway End)	1000' x 500'	1000' x 500'	1000' x 500'	1000' x 500'	1000' x 500'	1000' x 500'	1000' x 500'	1000' x 500'	600' x 300'	600' x 300'	600' x 300'	600' x 300'
OBJECT FREE AREA (Standard Beyond Runway End)	1000' x 800'	1000' x 800'	1000' x 800'	1000' x 800'	1000' x 800'	1000' x 800'	1000' x 800'	1000' x 800'	600' x 800'	600' x 800'	600' x 800'	600' x 800'
OBSTACLE FREE ZONE (Standard Beyond Runway End)	200' x 400'	200' x 400'	200' x 400'	200' x 400'	200' x 400'	200' x 400'	200' x 400'	200' x 400'	200' x 400'	200' x 400'	200' x 400'	200' x 400'
RUNWAY SAFETY AREA (Actual RSA Beyond Runway End)	1000' x 500'	1000' x 500'	1000' x 500'	1000' x 500'	1000' x 500'	1000' x 500'	1000' x 500'	1000' x 500'	600' x 300'	600' x 300'	600' x 300'	600' x 300'
OBJECT FREE AREA (Actual OFA Beyond Runway End)	1000' x 800'	1000' x 800'	1000' x 800'	1000' x 800'	1000' x 800'	1000' x 800'	1000' x 800'	1000' x 800'	600' x 800'	600' x 800'	600' x 800'	600' x 800'
INSTRUMENT NAVIGATIONAL AIDS	HI-ILS or LOC ILS or LOC VOR OR TACAN HI-TACAN ASR-9 RNAV (RNP) Z RNAV (GPS) Y	RNAV (RNP) Y RNAV (RNP) Z	HI-ILS or LOC ILS or LOC VOR OR TACAN HI-TACAN ASR-9 RNAV (RNP) Z RNAV (GPS) Y	RNAV (RNP) Y RNAV (RNP) Z	ILS or LOC RNAV (RNP) Z RNAV (GPS) Y ASR-9	RNAV (RNP) Y RNAV (RNP) Z	ILS or LOC RNAV (RNP) Z RNAV (GPS) Y ASR-9	RNAV (RNP) Y RNAV (RNP) Z	None	None	None	RNAV (GPS)
RUNWAY VISUAL NAVIGATIONAL AIDS	VASI-6	PAPI-4 REIL	VASI-6	PAPI-4 REIL	PAPI-4	PAPI-4 REIL	PAPI-4	PAPI-4 REIL	None	PAPI-4 REIL	None	PAPI-4 REIL

[1] Pavement strengths are expressed in Single (S), Dual (D), Dual Tandem (2D), and/or Double Dual Tandem (2D/2D2) wheel loading capacities.

[2] This Modification will remain in affect for the life of Runway 3-21 and Runway 8-26, or until rescinded by the FAA.

[3] AUTHORIZATION REQUIRED RNAV (RNP) Y & RNAV (RNP) Z

[4] B-III design standard width for Runway 12-30 is 100 feet. Prior to major pavement rehabilitation, a cost-benefit analysis will be conducted regarding this change in runway width. A safety risk analysis should also be conducted regarding the potential risks involved with a 75- foot-wide taxiway parallel to a 100-foot runway.

AIRPORT DATA

CITY: Albuquerque, New Mexico	COUNTY: Bernalillo, New Mexico		NPIAS SERVICE LEVEL: (P)
RANGE: 3-4 East TOWNSHIP: 9-10 North	CIVIL TOWNSHIP: Albuquerque		
ALBUQUERQUE INTERNATIONAL SUNPORT (ABQ)		EXISTING	ULTIMATE
AIRPORT REFERENCE CODE		D-IV	Same
CRITICAL AIRCRAFT WINGSPAN / UNDERCARRIAGE / APPROACH SPEED		MD83/88, B767-300 156.08' / 74.67' / 145 knots	Same
AIRPORT ELEVATION (NAVD 88)		5354.9' MSL	Same
STATE SERVICE ROLE		Primary Commercial Service	Primary Commercial Service
MEAN MAXIMUM TEMPERATURE OF HOTTEST MONTH		92 ° F (July)	Same
AIRPORT REFERENCE POINT (ARP) COORDINATES (NAD83)	Latitude	35° 02' 20.154" N	35° 02' 17.75" N
	Longitude	106° 36' 29.744" W	106° 36' 31.72" W
AIRPORT INSTRUMENT APPROACH		HI-ILS or LOC (8) ILS or LOC (3, 8) VOR OR TACAN (8) HI-TACAN (8)	HI-ILS or LOC (8) ILS or LOC (3, 8) VOR OR TACAN (8) HI-TACAN (8)
RADAR INSTRUMENT APPROACH MINIMUMS RADAR- 1		ASR-9 (3, 8) Circling All Runways	ASR-9 (3, 8) Circling All Runways
RNAV (GPS) APPROACH		RNAV (RNP) Y (21, 26) RNAV (RNP) Z (8, 26) RNAV (RNP) Z (3, 21) RNAV (GPS) Y (3, 8)	RNAV (RNP) Y (21, 26) RNAV (RNP) Z (8, 26) RNAV (RNP) Z (3, 21) RNAV (GPS) Y (3, 8) LPV CAT I (RWY 3) RNAV GPS (30)
AIRPORT and TERMINAL NAVIGATIONAL AIDS MISCELLANEOUS FACILITIES		LOC, GS, ATCT ROTATING BEACON ASOS, MITL VASI, PAPI, REIL, MALSR Lighted Wind Cone	ATCT ROTATING BEACON ASOS, MITL Lighted Wind Cone

RUNWAY END COORDINATES (NAD 83)

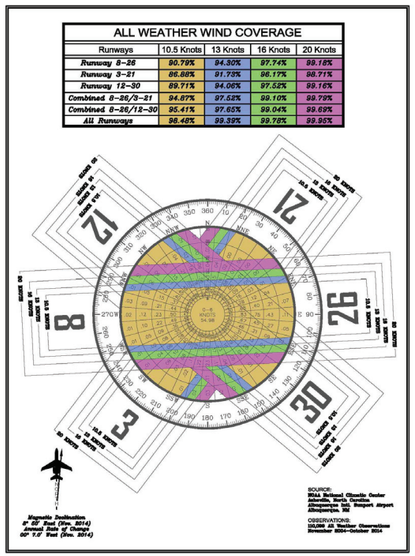
RUNWAY		SURVEYED	ULTIMATE
Runway 8 (EL. 5311.9)	Latitude	35° 02' 39.670" N	SAME
	Longitude	106° 37' 17.718" W	
Runway 8 Ext. 1000' Displaced Threshold (EL. 5314.7) Ult. 400' Dspd Thr (EL. 5313.1)	Latitude	35° 02' 39.596" N	35° 02' 39.64" N
	Longitude	106° 37' 05.691" W	106° 37' 12.91" W
Runway 26 (EL. 5354.9)	Latitude	35° 02' 38.626" N	SAME
	Longitude	106° 34' 31.886" W	
Runway 3 (EL. 5305.1) Ultimate Rwy 3 (EL. 5305.0)	Latitude	35° 01' 20.093" N	35° 01' 13.059" N
	Longitude	106° 37' 50.166" W	106° 37' 58.655" W
Runway 21 (EL. 5316.1)	Latitude	35° 02' 30.267" N	SAME
	Longitude	106° 36' 25.463" W	
Runway 12 (EL. 5312.4) Ultimate Rwy 12 (EL. 5314.0)	Latitude	35° 02' 36.720" N	35° 2' 33.01" N
	Longitude	106° 37' 14.705" W	106° 37' 9.10" W
Runway 30 (EL. 5313.6)	Latitude	35° 01' 59.500" N	SAME
	Longitude	106° 36' 18.529" W	

Airport Facilities (FAA Owned)

- ASOS
- VASI-6, MALSR, TDZE, HIRL (Rwy 8)
- PAPI-4, REIL, HIRL (Rwy 26)
- PAPI-4, MALSR, TDZE, C/L, HIRL (Rwy 3)
- PAPI-4, C/L, REIL, HIRL (Rwy 21)
- PAPI-4, MIRL (Rwy 12)
- PAPI-4, REIL, MIRL (Rwy 30)
- Localizer, Glide Slope (Rwy 8)
- Localizer, Glide Slope (Rwy 3)

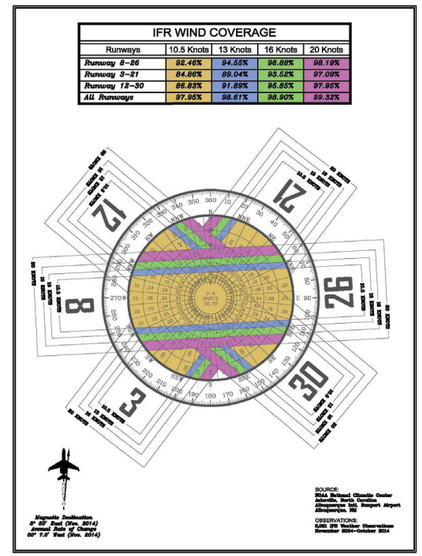
ALL WEATHER WIND COVERAGE

Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 8–26	90.79%	94.30%	97.74%	99.18%
Runway 3–21	86.88%	91.75%	96.17%	98.71%
Runway 12–30	89.71%	94.06%	97.52%	99.16%
Combined 8–26/3–21	94.67%	97.53%	99.10%	99.79%
Combined 8–26/12–30	95.41%	97.65%	99.04%	99.69%
All Runways	96.48%	98.39%	99.76%	99.90%



IFR WIND COVERAGE

Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 8–26	92.46%	94.55%	96.80%	98.19%
Runway 3–21	84.86%	89.04%	93.52%	97.09%
Runway 12–30	86.83%	91.89%	95.85%	97.95%
All Runways	97.95%	98.61%	98.90%	99.32%



DECLARED DISTANCES

	Runway 8-26				Runway 3-21				Runway 12-30			
	Existing		Ultimate		Existing		Ultimate		Existing		Ultimate	
TAKEOFF RUN AVAILABLE (TORA)	13,788'	13,788'	13,788'	13,788'	10,000'	10,000'	11,000'	11,000'	6,000'	6,000'	5,400'	5,400'
TAKEOFF DISTANCE AVAILABLE (TODA)	13,788'	13,788'	13,788'	13,788'	10,000'	10,000'	11,000'	11,000'	6,000'	6,000'	5,400'	5,400'
ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)	13,788'	13,788'	13,788'	13,788'	10,000'	10,000'	11,000'	11,000'	6,000'	6,000'	5,400'	5,400'
LANDING DISTANCE AVAILABLE (LDA)	12,788'	13,788'	13,388	13,788'	10,000'	10,000'	11,000'	11,000'	6,000'	6,000'	5,400'	5,400'

MODIFICATIONS FROM FAA AIRPORT DESIGN STANDARDS

MODIFICATION DESCRIPTION	EFFECTED DESIGN STANDARD	STANDARD	EXISTING	PROPOSED DISPOSITION
Airport Markings and Airport Sign (RDC D-IV)	AC 150/5340-1L, 150/5340-18F, 150/5300-13A (Holding Marking & Sign)	304'	250'	Runway 8-26 ABQ-MOD-04-001 (Sept. 8, 2004)
Airport Markings and Airport Sign (RDC D-IV)	AC 150/5340-1L, 150/5340-18F, 150/5300-13A (Holding Marking & Sign)	304'	250'	Runway 3-21 ABQ-MOD-04-001 (Sept. 8, 2004)

THRESHOLD SITING SURFACE OBJECT PENETRATIONS

OBJECT	PENETRATION	DISPOSITION
Roadway on 26	11' (Vehicle)	Vehicle Access Control

OBSTACLE FREE ZONE (OFZ) OBJECT PENETRATIONS

OBJECT	PENETRATION	DISPOSITION
No Obstacle Free Zone Object Penetrations		

GENERAL NOTES:

1. Depiction of features and objects, including related elevations and clearances, within the Federal Aviation Regulations (CFR14 Part 77 Approach Surface are depicted on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
2. Details concerning terminal improvements are depicted on the TERMINAL AREA DRAWINGS.
3. Vertical Datum NAVD 88 and Horizontal Datum NAD 83.

0 100 200 300

PLOT SCALE 1" = 100'

Magnetic Declination
8° 31'East (March 2018)
Annual Rate of Change 6' West

Supplemental Data Provided By:

..\COFFMAN\Molzen logo.jpg

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

AIRPORT DATA

Albuquerque, New Mexico

PLANNED BY: Patrick C. Taylor

DETAILED BY: Larry D. Johnson

APPROVED BY: Steven G. Benson, P.E.

August 21, 2018

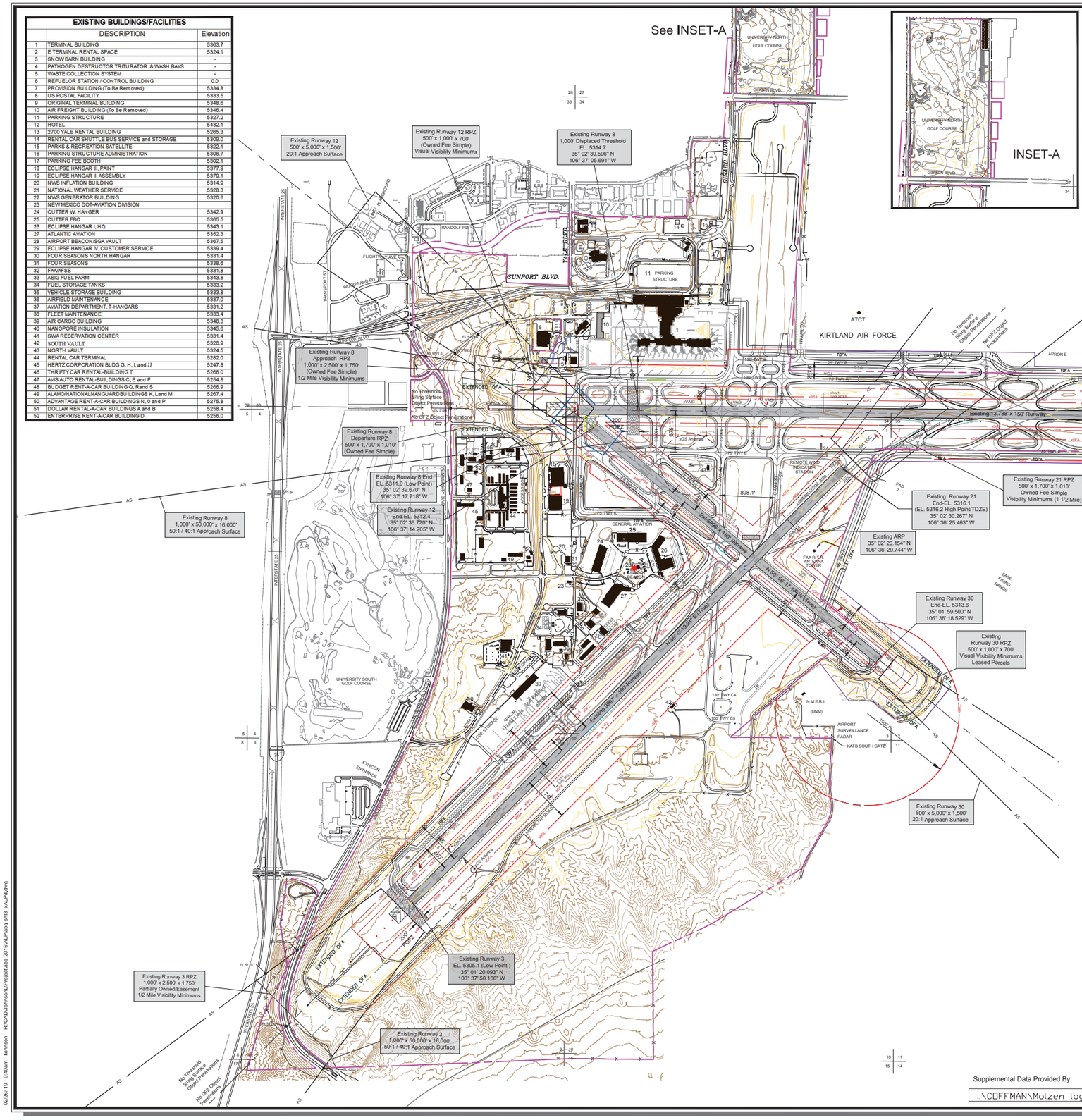
SHEET 2 OF 23

Coffman Associates
Airport Consultants
www.coffmanassociates.com

02/26/19 - 9:39am - ljohnson - R:\CAD\Johnson\Projects\abq-2018\ALP\abq-sht2_DATA.dwg

EXISTING BUILDINGS/FACILITIES

	DESCRIPTION	Elevation
1	TERMINAL BUILDING	5363.7
2	E TERMINAL RENTAL SPACE	5324.1
3	SNOW BARN BUILDING	-
4	PATHOGEN DESTRUCTOR TRITURATOR & WASH BAYS	-
5	WASTE COLLECTION SYSTEM	-
6	REFUELOR STATION / CONTROL BUILDING	0.0
7	PROVISION BUILDING (To Be Removed)	5334.8
8	US POSTAL FACILITY	5333.5
9	ORIGINAL TERMINAL BUILDING	5348.6
10	AIR FREIGHT BUILDING (To Be Removed)	5346.4
11	PARKING STRUCTURE	5327.2
12	HOTEL	5432.1
13	2700 YALE RENTAL BUILDING	5265.3
14	RENTAL CAR SHUTTLE BUS SERVICE and STORAGE	5309.0
15	PARKS & RECREATION SATELLITE	5322.1
16	PARKING STRUCTURE ADMINISTRATION	5306.7
17	PARKING FEE BOOTH	5302.1
18	ECLIPSE HANGAR III, PAINT	5377.9
19	ECLIPSE HANGAR II, ASSEMBLY	5379.1
20	NWS INFLATION BUILDING	5314.9
21	NATIONAL WEATHER SERVICE	5328.3
22	NWS GENERATOR BUILDING	5320.6
23	NEW MEXICO DOT-AVIATION DIVISION	
24	CUTTER W. HANGER	5342.9
25	CUTTER FBO	5365.5
26	ECLIPSE HANGAR I, HQ	5343.1
27	ATLANTIC AVIATION	5352.3
28	AIRPORT BEACON/SGA VAULT	5367.5
29	ECLIPSE HANGAR IV, CUSTOMER SERVICE	5339.4
30	FOUR SEASONS NORTH HANGAR	5331.4
31	FOUR SEASONS	5338.6
32	FAA/AFSS	5331.8
33	ASIG FUEL FARM	5343.8
34	FUEL STORAGE TANKS	5333.2
35	VEHICLE STORAGE BUILDING	5333.8
36	AIRFIELD MAINTENANCE	5337.0
37	AVIATION DEPARTMENT, T-HANGARS	5331.2
38	FLEET MAINTENANCE	5333.4
39	AIR CARGO BUILDING	5348.3
40	NANOPORE INSULATION	5345.6
41	SWA RESERVATION CENTER	5331.4
42	SOUTH VAULT	5326.9
43	NORTH VAULT	5324.5
44	RENTAL CAR TERMINAL	5282.0
45	HERTZ CORPORATION BLDG G, H, I, and JJ	5247.8
46	THRIFTY CAR RENTAL-BUILDING T	5266.0
47	AVIS AUTO RENTAL-BUILDINGS C, E and F	5254.8
48	BUDGET RENT-A-CAR BUILDING Q, Rand S	5266.9
49	ALAMO/NATIONAL/ANGUARD BUILDINGS K, Land M	5267.4
50	ADVANTAGE RENT-A-CAR BUILDINGS N, O and P	5275.8
51	DOLLAR RENTAL-A-CAR BUILDINGS A and B	5258.4
52	ENTERPRISE RENT-A-CAR BUILDING D	5256.0



GENERAL NOTES:

1. Depiction of features and objects, including related elevations and clearances, within the Federal Aviation Regulations (CFR14) Part 77 Approach Surface are depicted on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
2. Details concerning terminal improvements are depicted on the TERMINAL AREA DRAWING.
3. Vertical Datum NAVD-88 and Horizontal Datum NAD-83.
4. Runway 8-26 and Runway 3-21 Aircraft holding positions sign/line for design D-IV are 304' from runway centerline.
5. City of Albuquerque Integrated Development Ordinance Part 14-16-3.3 Airport Protection Overlay Zone requires landuse at or around public airport facilities comfy with FAA regulations that protect the public from noise, vibration, and hazard impacts of airport operations and that protect the safety of aircraft operations.
6. Date of Mapping 12/14/2009.

LEGEND

EXISTING	DESCRIPTION
	ABANDONED PAVEMENT (To Be Removed)
	AIRPORT ROTATING BEACON
	BUILDING
	DRAINAGE
	PAVEMENT FACILITY CONSTRUCTION
PAPI-4	NAVIGATIONAL AID INSTALLATION
REIL	RUNWAY END IDENTIFICATION LIGHTS
	RUNWAY THRESHOLD LIGHTS
	SECTION CORNER
5350	TOPOGRAPHY (Date of Mapping 12/14/2009)
	HOLDING POSITION MARKING
	DIRT ROAD
	FENCING (up to 8' AGL)
	AIRPORT PROPERTY LINE
BRL	BUILDING RESTRICTION LINE (BRL)
EXTD OFA	EXTENDED OFA
	PARCELS
TOFA	TAXIWAY OFA
xOFA	OBJECT FREE AREA
xRSA	RUNWAY SAFETY AREA
xOFZ	OBSTACLE FREE ZONE
	MALSR APPROACH LIGHT SYSTEM (Existing)
AS	APPROACH SURFACE
	RUNWAY PROTECTION ZONE (RPZ)
	GLIDE SLOPE ANTENNA
xGS	GLIDE SLOPE CRITICAL AREA
	LOCALIZER ANTENNA
xLOC	LOC CRITICAL AREA
VASI-6	NAVIGATIONAL AID INSTALLATION (VASI-6)
	PRECISION OBSTACLE FREE ZONE (POFZ)

FAA APPROVAL STAMP

FOR APPROVAL BY:

Nyika A. Allen
Director

DATE:

Magnetic Declination
8° 31'East (March 2016)
Annual Rate of Change 6' West

0 800 1600 2400
SCALE IN FEET

Supplemental Data Provided By:
..\COFFMAN\Molzen logo.jpg

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

EXISTING AIRPORT LAYOUT PLAN DRAWING

Albuquerque, New Mexico

PLANNED BY:	Patrick C. Taylor
DETAILED BY:	Larry D. Johnson
APPROVED BY:	Steven G. Benson, P.E.
August 21, 2018	SHEET 3 OF 23

Coffman Associates
Airport Consultants
www.coffmanassociates.com

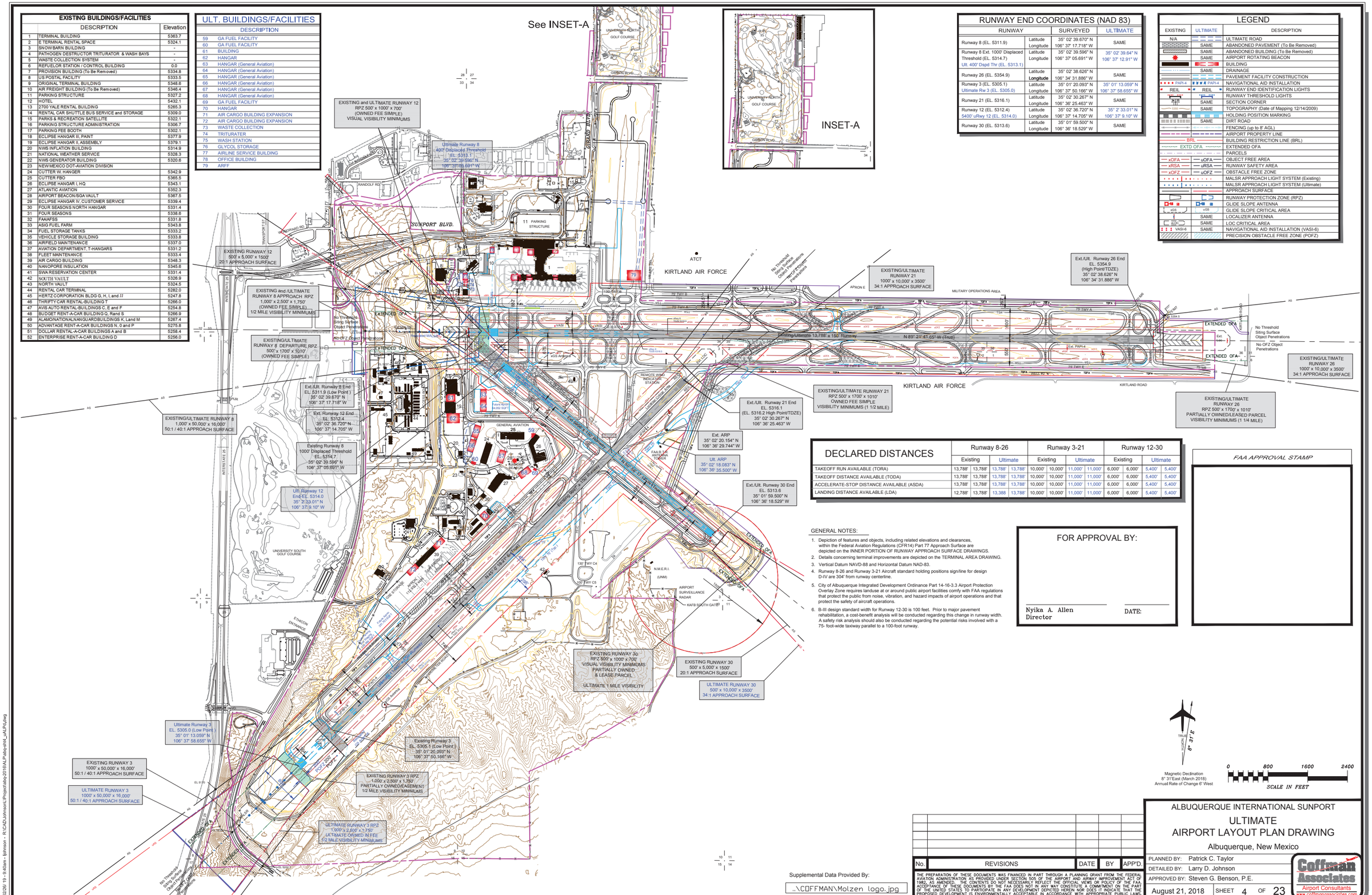
02/26/19 - 9:40am - bjohnson - R:\CADD\Johnson\Projects\abq-2016\ALP\abq-alp03_xALP.dwg

EXISTING BUILDINGS/FACILITIES

	DESCRIPTION	Elevation
1	TERMINAL BUILDING	5363.7
2	E TERMINAL RENTAL SPACE	5324.1
3	SNOW BARN BUILDING	-
4	PATHOGEN DESTRUCTOR TRITURATOR & WASH BAYS	-
5	WASTE COLLECTION SYSTEM	-
6	REFUELOR STATION / CONTROL BUILDING	0.0
7	PROVISION BUILDING (To Be Removed)	5334.8
8	US POSTAL FACILITY	5333.5
9	ORIGINAL TERMINAL BUILDING	5348.6
10	AIR FREIGHT BUILDING (To Be Removed)	5346.4
11	PARKING STRUCTURE	5327.2
12	HOTEL	5432.1
13	2700 YALE RENTAL BUILDING	5265.3
14	RENTAL CAR SHUTTLE BUS SERVICE and STORAGE	5309.0
15	PARKS & RECREATION SATELLITE	5322.1
16	PARKING STRUCTURE ADMINISTRATION	5306.7
17	PARKING FEE BOOTH	5302.1
18	ECLIPSE HANGAR III, PAINT	5377.9
19	ECLIPSE HANGAR II, ASSEMBLY	5379.1
20	NWS INFLATION BUILDING	5314.9
21	NATIONAL WEATHER SERVICE	5328.3
22	NWS GENERATOR BUILDING	5320.6
23	NEW MEXICO DOT-AVIATION DIVISION	
24	CUTTER W. HANGER	5342.9
25	CUTTER FBO	5365.5
26	ECLIPSE HANGAR I, HQ	5343.1
27	ATLANTIC AVIATION	5352.3
28	AIRPORT BEACON/SGA VAULT	5367.5
29	ECLIPSE HANGAR IV, CUSTOMER SERVICE	5339.4
30	FOUR SEASONS NORTH HANGAR	5331.4
31	FOUR SEASONS	5338.6
32	FAA/AFSS	5331.8
33	ASIG FUEL FARM	5343.8
34	FUEL STORAGE TANKS	5333.2
35	VEHICLE STORAGE BUILDING	5333.8
36	AIRFIELD MAINTENANCE	5337.0
37	AVIATION DEPARTMENT, T-HANGARS	5331.2
38	FLEET MAINTENANCE	5333.4
39	AIR CARGO BUILDING	5348.3
40	NANOPORE INSULATION	5345.6
41	SWA RESERVATION CENTER	5331.4
42	SOUTH VAULT	5326.9
43	NORTH VAULT	5324.5
44	RENTAL CAR TERMINAL	5282.0
45	HERTZ CORPORATION BLDG G, H, I, and JJ	5247.8
46	THRIFTY CAR RENTAL-BUILDING T	5266.0
47	AVIS AUTO RENTAL-BUILDINGS C, E and F	5254.8
48	BUDGET RENT-A-CAR BUILDING Q, Rand S	5266.9
49	ALAMO/NATIONAL/ANGUARD BUILDINGS K, Land M	5267.4
50	ADVANTAGE RENT-A-CAR BUILDINGS N, O and P	5275.8
51	DOLLAR RENTAL-A-CAR BUILDINGS A and B	5258.4
52	ENTERPRISE RENT-A-CAR BUILDING D	5256.0

ULT. BUILDINGS/FACILITIES

	DESCRIPTION
59	GA FUEL FACILITY
60	GA FUEL FACILITY
61	BUILDING
62	HANGAR
63	HANGAR (General Aviation)
64	HANGAR (General Aviation)
65	HANGAR (General Aviation)
66	HANGAR (General Aviation)
67	HANGAR (General Aviation)
68	HANGAR (General Aviation)
69	GA FUEL FACILITY
70	HANGAR
71	AIR CARGO BUILDING EXPANSION
72	AIR CARGO BUILDING EXPANSION
73	WASTE COLLECTION
74	TRITURATER
75	WASH STATION
76	GLYCOL STORAGE
77	AIRLINE SERVICE BUILDING
78	OFFICE BUILDING
79	ARFF



RUNWAY END COORDINATES (NAD 83)

RUNWAY		SURVEYED	ULTIMATE
Runway 8 (EL. 5311.9)	Latitude	35° 02' 39.670" N	SAME
	Longitude	106° 37' 17.718" W	
Runway 8 Ext. 1000' Displaced Threshold (EL. 5314.7) Ult. 400' Dspd Thr (EL. 5313.1)	Latitude	35° 02' 39.596" N	35° 02' 39.64" N
	Longitude	106° 37' 05.691" W	106° 37' 12.91" W
Runway 26 (EL. 5354.9)	Latitude	35° 02' 38.626" N	SAME
	Longitude	106° 34' 31.886" W	
Runway 3 (EL. 5305.1) Ultimate Rw 3 (EL. 5305.0)	Latitude	35° 01' 20.093" N	35° 01' 13.059" N
	Longitude	106° 37' 50.166" W	106° 37' 58.655" W
Runway 21 (EL. 5316.1)	Latitude	35° 02' 30.267" N	SAME
	Longitude	106° 36' 25.463" W	
Runway 12 (EL. 5312.4) 5400' uRwy 12 (EL. 5314.0)	Latitude	35° 02' 36.720" N	35° 2' 33.01" N
	Longitude	106° 37' 14.705" W	106° 37' 9.10" W
Runway 30 (EL. 5313.6)	Latitude	35° 01' 59.500" N	SAME
	Longitude	106° 36' 18.529" W	

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
N/A		ULTIMATE ROAD
	SAME	ABANDONED PAVEMENT (To Be Removed)
	SAME	ABANDONED BUILDING (To Be Removed)
	SAME	AIRPORT ROTATING BEACON
		BUILDING
	SAME	DRAINAGE
		PAVEMENT FACILITY CONSTRUCTION
PAPI-4	PAPI-4	NAVIGATIONAL AID INSTALLATION
REIL	REIL	RUNWAY END IDENTIFICATION LIGHTS
		RUNWAY THRESHOLD LIGHTS
	SAME	SECTION CORNER
	SAME	TOPOGRAPHY (Date of Mapping 12/14/2009)
		HOLDING POSITION MARKING
	SAME	DIRT ROAD
		FENCING (up to 8' AGL)
		AIRPORT PROPERTY LINE
BRL		BUILDING RESTRICTION LINE (BRL)
EXTD OFA		EXTENDED OFA
		PARCELS
xOFA	uOFA	OBJECT FREE AREA
xRSA	uRSA	RUNWAY SAFETY AREA
xOFZ	uOFZ	OBSTACLE FREE ZONE
		MALSR APPROACH LIGHT SYSTEM (Existing)
		MALSR APPROACH LIGHT SYSTEM (Ultimate)
		APPROACH SURFACE
		RUNWAY PROTECTION ZONE (RPZ)
GS	GS	GLIDE SLOPE ANTENNA
xGS	uGS	GLIDE SLOPE CRITICAL AREA
	SAME	LOCALIZER ANTENNA
xLOC	SAME	LOC CRITICAL AREA
VASI-6	SAME	NAVIGATIONAL AID INSTALLATION (VASI-6)
	SAME	PRECISION OBSTACLE FREE ZONE (POFZ)

DECLARED DISTANCES

	Runway 8-26				Runway 3-21				Runway 12-30			
	Existing		Ultimate		Existing		Ultimate		Existing		Ultimate	
TAKEOFF RUN AVAILABLE (TORA)	13,788'	13,788'	13,788'	13,788'	10,000'	10,000'	11,000'	11,000'	6,000'	6,000'	5,400'	5,400'
TAKEOFF DISTANCE AVAILABLE (TODA)	13,788'	13,788'	13,788'	13,788'	10,000'	10,000'	11,000'	11,000'	6,000'	6,000'	5,400'	5,400'
ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)	13,788'	13,788'	13,788'	13,788'	10,000'	10,000'	11,000'	11,000'	6,000'	6,000'	5,400'	5,400'
LANDING DISTANCE AVAILABLE (LDA)	12,788'	13,788'	13,388'	13,788'	10,000'	10,000'	11,000'	11,000'	6,000'	6,000'	5,400'	5,400'

GENERAL NOTES:

1. Depiction of features and objects, including related elevations and clearances, within the Federal Aviation Regulations (CFR14) Part 77 Approach Surface are depicted on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
2. Details concerning terminal improvements are depicted on the TERMINAL AREA DRAWING.
3. Vertical Datum NAVD-88 and Horizontal Datum NAD-83.
4. Runway 8-26 and Runway 3-21 Aircraft standard holding positions sign/line for design D-IV are 304' from runway centerline.
5. City of Albuquerque Integrated Development Ordinance Part 14-16-3.3 Airport Protection Overlay Zone requires landuse at or around public airport facilities comfy with FAA regulations that protect the public from noise, vibration, and hazard impacts of airport operations and that protect the safety of aircraft operations.
6. B-III design standard width for Runway 12-30 is 100 feet. Prior to major pavement rehabilitation, a cost-benefit analysis will be conducted regarding this change in runway width. A safety risk analysis should also be conducted regarding the potential risks involved with a 75- foot-wide taxiway parallel to a 100-foot runway.

FAA APPROVAL STAMP

FOR APPROVAL BY:

Nyika A. Allen
Director

DATE:

Magnetic Declination
8° 31'East (March 2018)
Annual Rate of Change 6' West

0 800 1600 2400
SCALE IN FEET

Supplemental Data Provided By:

..\COFFMAN\Molzen logo.jpg

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

ULTIMATE AIRPORT LAYOUT PLAN DRAWING

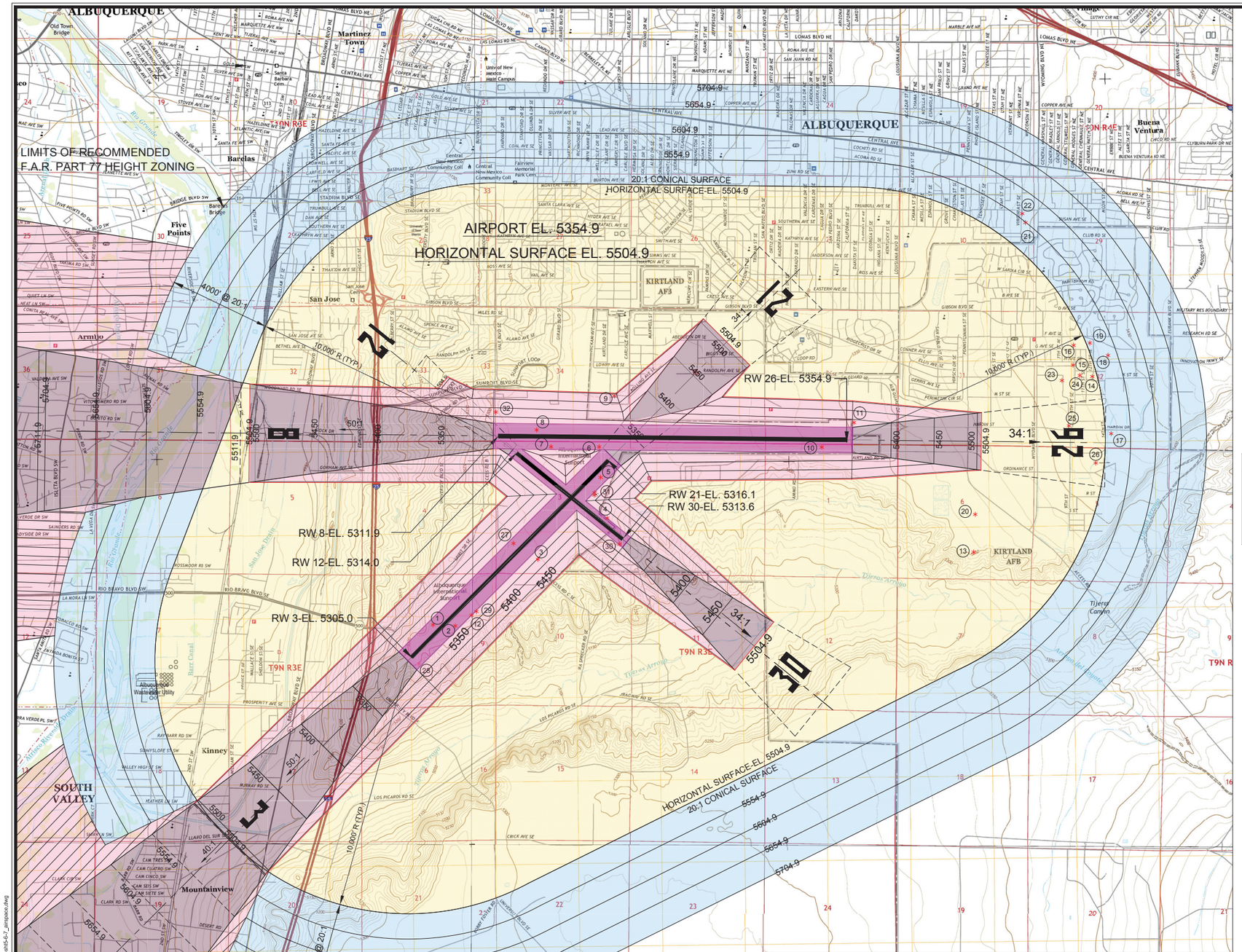
Albuquerque, New Mexico

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Steven G. Benson, P.E.

August 21, 2018 SHEET 4 OF 23

Coffman Associates
Airport Consultants
www.coffmanassociates.com

02/26/19 - 9:40am - johnson - R:\CADJohnson\Projects\dwg-2016\ALP\alp-plnt4_ULP.dwg



OBSTRUCTION TABLE

	Object Description and Elevation	Obstructed Part 77 Surface	Surface Elevation	Object Penetration	Proposed Disposition
1	OL WINDSOCK-EL. 5327.0	PRIMARY SURFACE	5306.4 MSL	20.6'	"NO ACTION"
2	OL GLIDE SLOPE-EL. 5332.1	PRIMARY SURFACE	5307.9 MSL	24.2'	"NO ACTION"
3	PIPE ON BUILDING-EL. 5356.7	TRANSITIONAL SURFACE	5352.7 MSL	4'	2001ASW03007OE
4	OL WINDSOCK-EL. 5331.4	TRANSITIONAL SURFACE	5315 MSL	16.4'	"NO ACTION"
5	OL WINDSOCK-EL. 5334.9	PRIMARY SURFACE	5315 MSL	14'	"NO ACTION"
6	ANT ON BUILDING-EL. 5324.1	PRIMARY SURFACE	5320.2 MSL	3.9'	"NO ACTION"
7	OL GLIDE SLOPE-EL. 5363.7	PRIMARY SURFACE	5316.5 MSL	47.2'	"NO ACTION"
8	OL WINDSOCK-EL. 5319.3	PRIMARY SURFACE	5316.1 MSL	3.2'	"NO ACTION"
9	ANTENNA ON OL ATCT-EL. 5525.0	TRANSITIONAL SURFACE	5489.0 MSL	36'	"NO ACTION"
10	OL LTD WINDSOCK-EL. 5364.7	PRIMARY SURFACE	5349.8 MSL	14.9'	"NO ACTION"
11	LIGHT POLE-EL. 5393.8	TRANSITIONAL SURFACE	5384.6 MSL	9.2'	RELOCATE
12	ROAD-EL. 5325.2	PRIMARY SURFACE	5312.1 MSL	13.1'	RELOCATE
13	TOWER-EL. 5511.7	HORIZONTAL SURFACE	5504.9 MSL	6.8'	REQUEST DONH *
14	BUILDING-EL. 5533.5	HORIZONTAL SURFACE	5504.9 MSL	28.6'	REQUEST DONH *
15	POLE-EL. 5533.5	HORIZONTAL SURFACE	5504.9 MSL	28.6'	REQUEST DONH *
16	POLE-EL. 5505.1	HORIZONTAL SURFACE	5504.9 MSL	0.2'	REQUEST DONH *
17	POLE-EL. 5509	CONICAL SURFACE	5516.8 MSL	-7.8' (CLEAR)	"NO ACTION"
18	TANK-EL. 5606	CONICAL SURFACE	5537.3 MSL	68.7'	REQUEST DONH *
19	TOWER-EL. 5592	CONICAL SURFACE	5511.9 MSL	80.1'	REQUEST DONH *
20	LIGHT POLE-EL. 5504.5	HORIZONTAL SURFACE	5504.9 MSL	-0.4' (CLEAR)	REQUEST DONH *
21	TOWER-EL. 5559	CONICAL SURFACE	5505.8 MSL	53.2'	2004ASW03769OE
22	TOWER-EL. 5563	CONICAL SURFACE	5561.7 MSL	-1.3' (CLEAR)	2009ASW03224OE
23	T-L TOWER-EL. 5504	HORIZONTAL SURFACE	5504.9 MSL	.9'	2006ASW07331OE
24	BUILDING-EL. 5532	HORIZONTAL SURFACE	5504.9 MSL	27.1'	REQUEST DONH *
25	POLE-EL. 5504	HORIZONTAL SURFACE	5504.9 MSL	.9'	REQUEST DONH *
26	TOWER-EL. 5540	HORIZONTAL SURFACE	5504.9 MSL	4.1'	2002ASW04289OE
27	POLE-EL. 5316	TRANSITIONAL SURFACE	5312.2 MSL	3.8'	RELOCATE/REQUEST DONH *
28	BUILDING-EL. 5316	PRIMARY SURFACE	5305 MSL	11'	RELOCATE
29	FENCE-EL. 5320	TRANSITIONAL SURFACE	5310.8 MSL	9.2'	RELOCATE FENCE
30	ELECTRICAL-EQUIP.-EL. 5315	PRIMARY SURFACE	5313.6 MSL	1.4'	RELOCATE
31	TOWER-EL. 5361	TRANSITIONAL SURFACE	5324.2 MSL	26.8'	RELOCATE/REQUEST DONH *
32	TOWER-EL. 5393	TRANSITIONAL SURFACE	5355.9 MSL	37.1'	RELOCATE/REQUEST DONH *

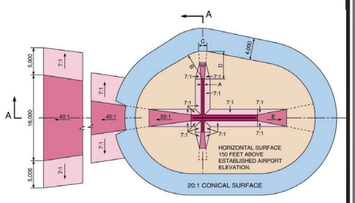
* FAA Determination of No Hazard

OBSTRUCTION LEGEND

*1 OBSTRUCTION

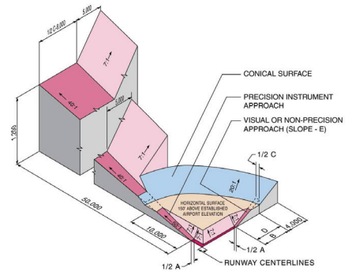
GROUP or MULTIPLE OBSTRUCTIONS

TOPOGRAPHIC OBSTRUCTION

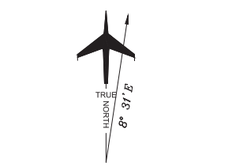


DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B C	B D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
		A	B	A	B C	B D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A - UTILITY RUNWAYS
B - RUNWAYS LARGER THAN UTILITY
C - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
D - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
* - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET



ISOMETRIC VIEW OF SECTION A-A



Magnetic Declination
8° 31'East (March 2018)
Annual Rate of Change 6' West

SOURCE: 14 CFR Part 77, Section 77.25, Civil Airport Imaginary Surfaces.

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
5. City of Albuquerque Integrated Development Ordinance Part 14-16-3.3 Airport Protection Overlay Zone requires landuse at or around public airport facilities comfy with FAA regulations that protect the public from noise, vibration, and hazard impacts of airport operations and that protect the safety of aircraft operations.
6. Date of Obstruction Survey: 7/13/2010

Supplemental Data Provided By:

..\COFFMAN\Molzen logo.jpg

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

AIRPORT AIRSPACE DRAWING
PART 77 CONICAL SURFACE

Albuquerque, New Mexico

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Steven G. Benson, P.E.

August 21, 2018 | SHEET 5 OF 23

Coffman Associates
Airport Consultants
www.coffmanassociates.com

02/26/19 - 9:46am - tjohnson - R:\CAD\Johnson\LP\projects\ALP\Abq-sht55-57_airspace.dwg

RUNWAY 8 OBSTRUCTION TABLE

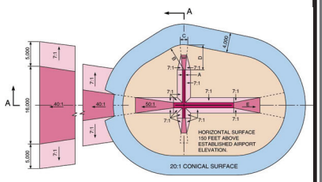
Object Description	Object Elevation	Obstructed Part 77 Surface	Surface Elevation	Object Penetration	Proposed Object Disposition
– None	–	–	–	–	–

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
5. City of Albuquerque Integrated Development Ordinance Part 14-16-3.3 Airport Protection Overlay Zone requires landuse at or around public airport facilities comfy with FAA regulations that protect the public from noise, vibration, and hazard impacts of airport operations and that protect the safety of aircraft operations.
6. Date of Obstruction Survey: 7/13/2010

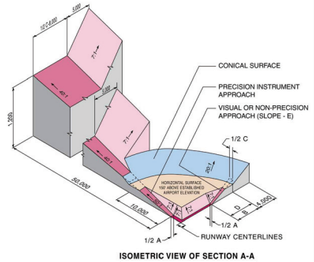
OBSTRUCTION LEGEND

- OBSTRUCTION
- GROUP or MULTIPLE OBSTRUCTIONS
- TOPOGRAPHIC OBSTRUCTION



DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B C	B D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
		A	B	A	B C	B D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A - UTILITY RUNWAYS
B - RUNWAYS LARGER THAN UTILITY
C - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
D - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
* - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET



ISOMETRIC VIEW OF SECTION A-A

SOURCE: 14 CFR Part 77, Section 77.25, Civil Airport Imaginary Surfaces.

TRUE NORTH
8° 31' E

Magnetic Declination
8° 31'East (March 2018)
Annual Rate of Change 6' West

0 2000 4000 6000
SCALE IN FEET

Supplemental Data Provided By:
..\COFFMAN\Molzen logo.jpg

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

AIRPORT AIRSPACE DRAWING
PART 77 RUNWAY 8 APPROACH

Albuquerque, New Mexico

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Steven G. Benson, P.E.

August 21, 2018 | SHEET 6 OF 23

Coffman Associates
Airport Consultants
www.coffmanassociates.com

02/20/19 - 9:47am - bjohnson - R:\CADD\Johnson\Projects\abq-2016\ALP\Abq-8rl15-6r7_airspace.dwg

RUNWAY 3 OBSTRUCTION TABLE

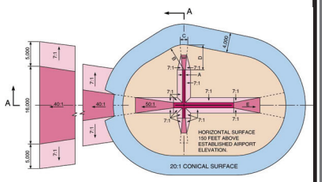
Object Description	Object Elevation	Obstructed Part 77 Surface	Surface Elevation	Object Penetration	Proposed Object Disposition
– None	–	–	–	–	–

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
5. City of Albuquerque Integrated Development Ordinance Part 14-16-3.3 Airport Protection Overlay Zone requires landuse at or around public airport facilities comfy with FAA regulations that protect the public from noise, vibration, and hazard impacts of airport operations and that protect the safety of aircraft operations.
6. Date of Obstruction Survey: 7/13/2010

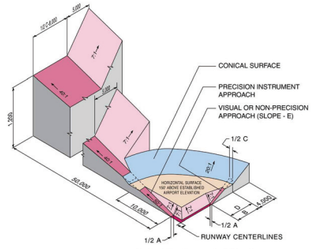
OBSTRUCTION LEGEND

- OBSTRUCTION
- GROUP or MULTIPLE OBSTRUCTIONS
- TOPOGRAPHIC OBSTRUCTION



DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B C	B D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
		A	B	A	B C	B D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A - UTILITY RUNWAYS
B - RUNWAYS LARGER THAN UTILITY
C - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
D - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
* - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET



ISOMETRIC VIEW OF SECTION A-A

SOURCE: 14 CFR Part 77, Section 77.25, Civil Airport Imaginary Surfaces.

Magnetic Declination
8° 31'East (March 2018)
Annual Rate of Change 6' West

0 2000 4000 6000
SCALE IN FEET

Supplemental Data Provided By:
..\COFFMAN\Molzen logo.jpg

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEW OR POLICIES OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

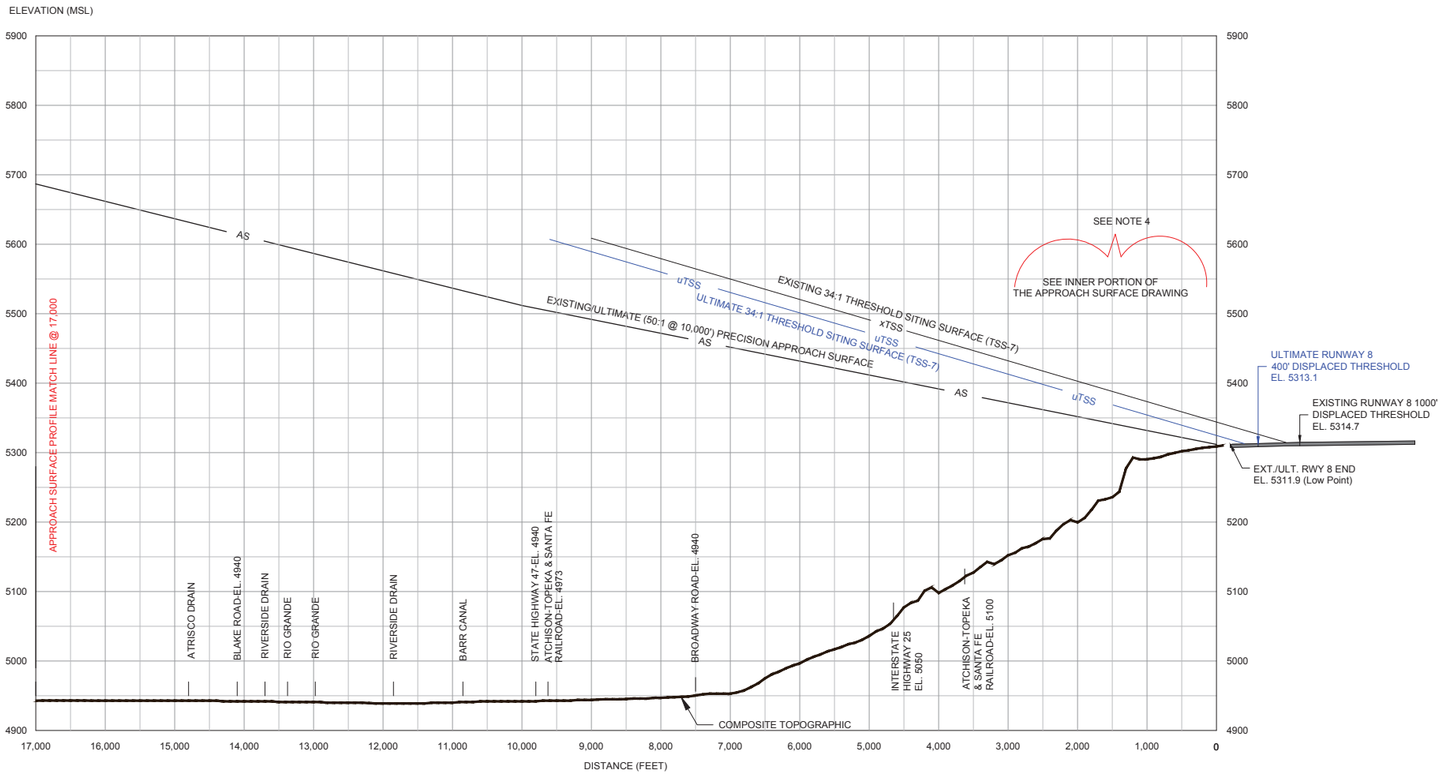
ALBUQUERQUE INTERNATIONAL SUNPORT
AIRPORT AIRSPACE DRAWING
PART 77 RUNWAY 3 APPROACH
Albuquerque, New Mexico

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Steven G. Benson, P.E.
August 21, 2018 SHEET 7 OF 23

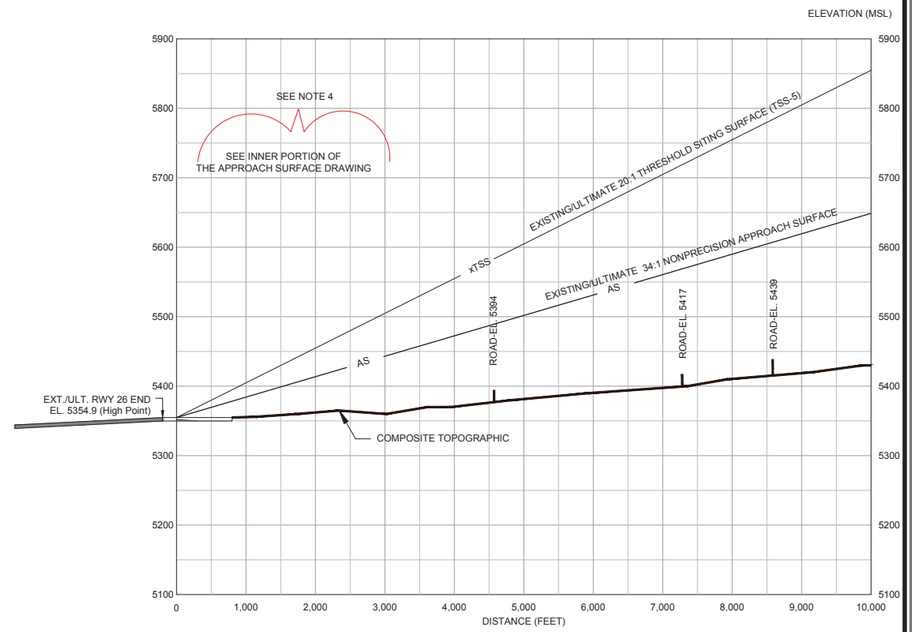
Coffman Associates
Airport Consultants
www.coffmanassociates.com

02/26/19 - 9:48am - ljohnson - R:\CAD\Johnson\Projects\abq-2016\ALP\Abq-sht5-6-7_airspace.dwg

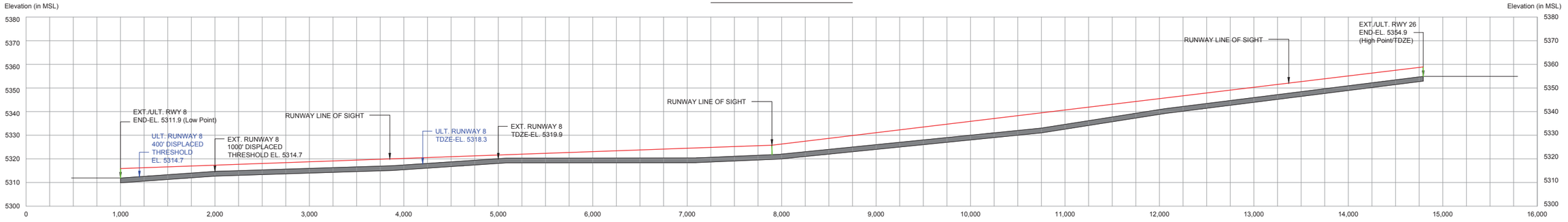
RUNWAY 8 APPROACH PROFILE



RUNWAY 26 APPROACH PROFILE



RUNWAY 8-26 PROFILE



RUNWAY 8 OBSTRUCTION TABLE

Object Description	Object Elevation	Obstructed Part 77 Surface	Surface Elevation	Object Penetration	Proposed Object Disposition
NONE FOUND					

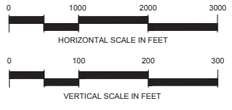
RUNWAY 26 OBSTRUCTION TABLE

Object Description	Object Elevation	Obstructed Part 77 Surface	Surface Elevation	Object Penetration	Proposed Object Disposition
NONE FOUND					

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
5. City of Albuquerque Integrated Development Ordinance Part 14-16-3.3 Airport Protection Overlay Zone requires landuse at or around public airport facilities comfy with FAA regulations that protect the public from noise, vibration, and hazard impacts of airport operations and that protect the safety of aircraft operations.
6. Date of Obstruction Survey: 7/13/2010

Magnetic Declination
8° 31'East (March 2018)
Annual Rate of Change 6' West



Supplemental Data Provided By:

..\COFFMAN\Molzen logo.jpg

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

RUNWAY 8-26 PART 77
APPROACH SURFACE PROFILES

Albuquerque, New Mexico

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Steven G. Benson, P.E.

August 21, 2018 | SHEET 8 OF 23

Coffman Associates
Airport Consultants
www.coffmanassociates.com

02/20/19 - 9:52am - bjohnson - R:\CAD\Johnson\Projects\abq-2019\ALP\Abq-alp8-12_AS_profiles.dwg

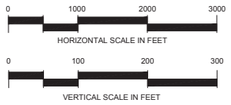
EXISTING 40:1 APPROACH SURFACE PROFILE

RUNWAY 8 OBSTRUCTION TABLE					
Object Description	Object Elevation	Obstructed Part 77 Surface	Surface Elevation	Object Penetration	Proposed Object Disposition
NONE FOUND					

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
5. City of Albuquerque Integrated Development Ordinance Part 14-16-3.3 Airport Protection Overlay Zone requires landuse at or around public airport facilities comfy with FAA regulations that protect the public from noise, vibration, and hazard impacts of airport operations and that protect the safety of aircraft operations.
6. Date of Obstruction Survey: 7/13/2010

Magnetic Declination
8° 31'East (March 2018)
Annual Rate of Change 6' West



Supplemental Data Provided By:

..\COFFMAN\Molzen logo.jpg

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

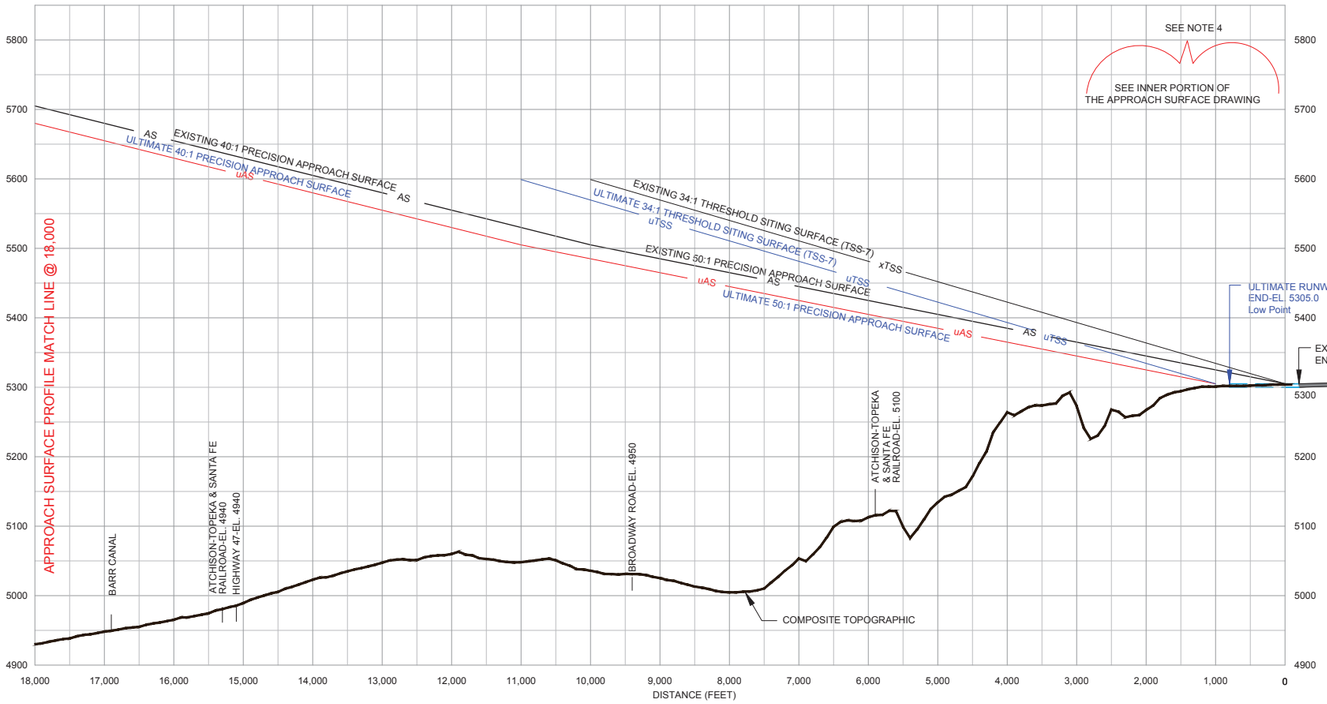
ALBUQUERQUE INTERNATIONAL SUNPORT
RUNWAY 8 PART 77
(40:1) APPROACH SURFACE PROFILE
Albuquerque, New Mexico

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Steven G. Benson, P.E.
August 21, 2018
SHEET 9 OF 23

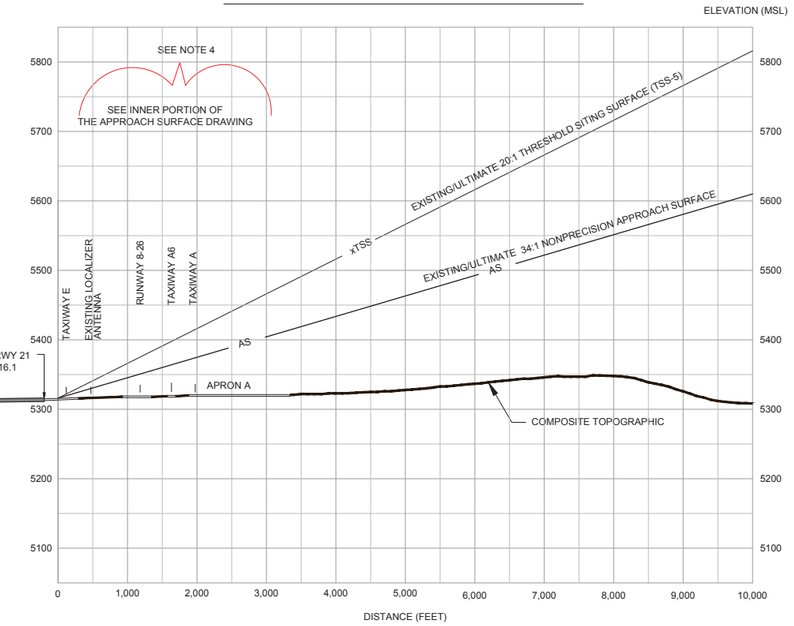
Coffman Associates
Airport Consultants
www.coffmanassociates.com

02/26/ 19 - 9:54am - ljohnson - R:\CAD\Johnson\L\Projects\abq-2016\ALP\Abq-sht8-12_AS_profiles.dwg

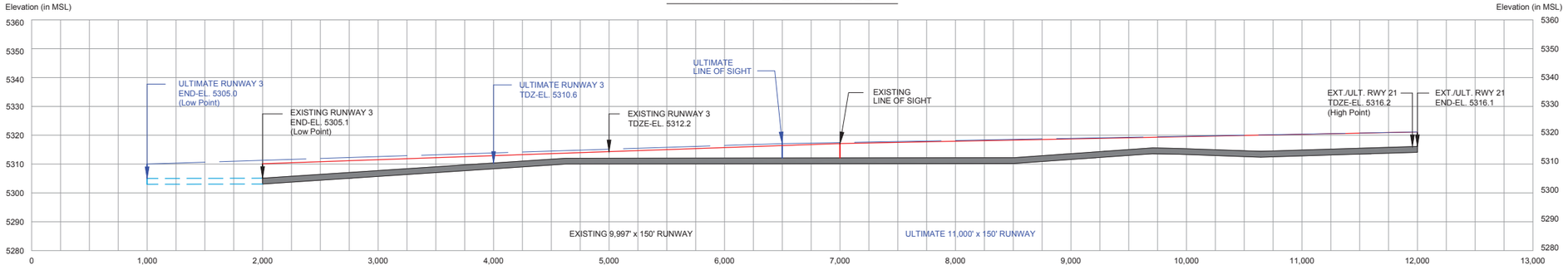
RUNWAY 3 APPROACH PROFILE



RUNWAY 21 APPROACH PROFILE



RUNWAY 3-21 PROFILE



RUNWAY 3 OBSTRUCTION TABLE

Object Description	Object Elevation	Obstructed Part 77 Surface	Surface Elevation	Object Penetration	Proposed Object Disposition
NONE FOUND					

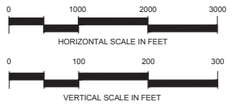
RUNWAY 21 OBSTRUCTION TABLE

Object Description	Object Elevation	Obstructed Part 77 Surface	Surface Elevation	Object Penetration	Proposed Object Disposition
NONE FOUND					

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
5. City of Albuquerque Integrated Development Ordinance Part 14-16-3.3 Airport Protection Overlay Zone requires landuse at or around public airport facilities comfy with FAA regulations that protect the public from noise, vibration, and hazard impacts of airport operations and that protect the safety of aircraft operations.
6. Date of Obstruction Survey: 7/13/2010

Magnetic Declination
8° 31'East (March 2018)
Annual Rate of Change 6' West



Supplemental Data Provided By:

..\COFFMAN\Molzen logo.jpg

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT
RUNWAY 3-21 PART 77
APPROACH SURFACE PROFILES
Albuquerque, New Mexico

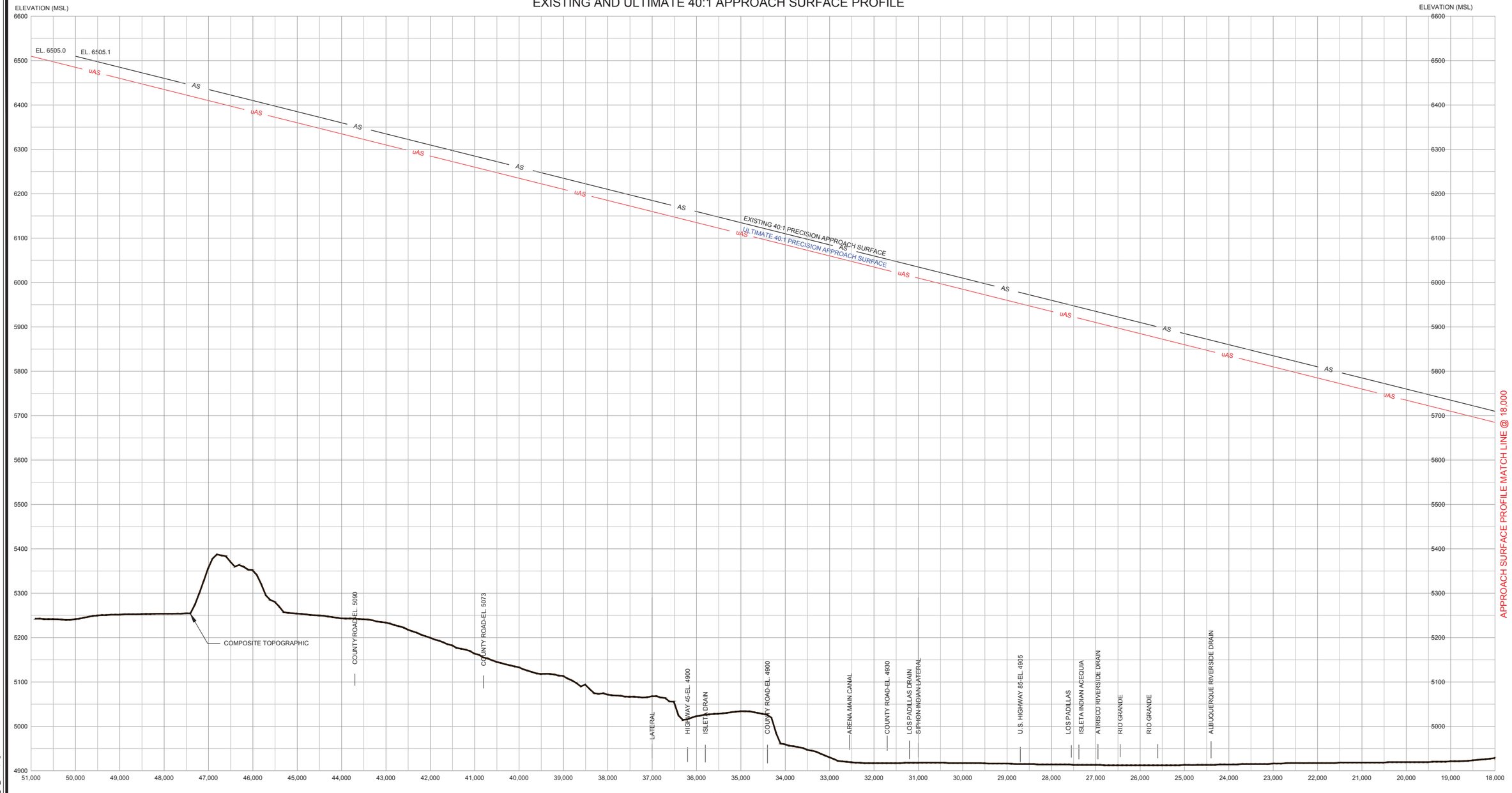
PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Steven G. Benson, P.E.

August 21, 2018 | SHEET 10 OF 23

Coffman Associates
Airport Consultants
www.coffmanassociates.com

02/26/19 - 9:55am - bjohnson - R:\CAD\Johnson\Projects\abq-2018\FAL\Pdfs\abq-air85-12_AS_profiles.dwg

EXISTING AND ULTIMATE 40:1 APPROACH SURFACE PROFILE



DISTANCE IN FEET FROM RUNWAY 3 APPROACH END

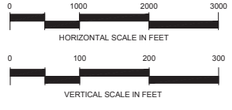
RUNWAY 3 OBSTRUCTION TABLE

Object Description	Object Elevation	Obstructed Part 77 Surface	Surface Elevation	Object Penetration	Proposed Object Disposition
NONE FOUND					

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
5. City of Albuquerque Integrated Development Ordinance Part 14-16-3.3 Airport Protection Overlay Zone requires landuse at or around public airport facilities comfy with FAA regulations that protect the public from noise, vibration, and hazard impacts of airport operations and that protect the safety of aircraft operations.
6. Date of Obstruction Survey: 7/13/2010

Magnetic Declination
8° 31'East (March 2018)
Annual Rate of Change 6' West



Supplemental Data Provided By:

..\COFFMAN\Molzen logo.jpg

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

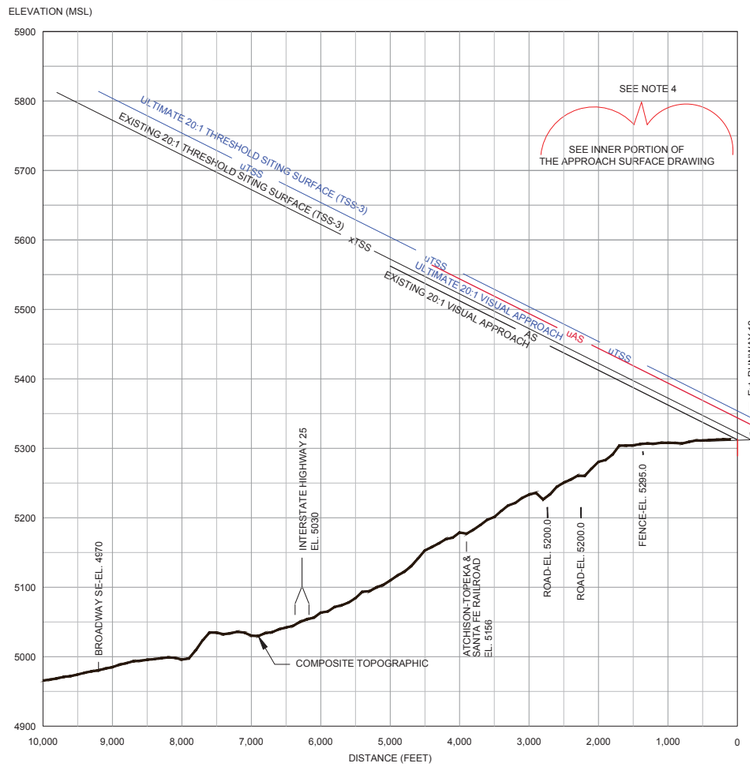
ALBUQUERQUE INTERNATIONAL SUNPORT
RUNWAY 3 PART 77
(40:1) APPROACH SURFACE PROFILE
Albuquerque, New Mexico

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Steven G. Benson, P.E.
August 21, 2018 SHEET 11 OF 23

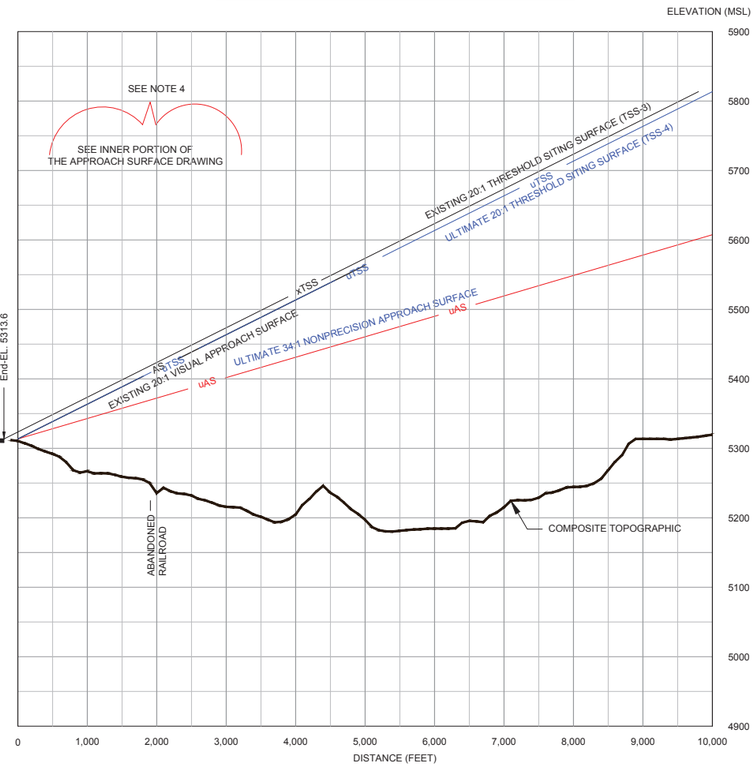
Coffman Associates
Airport Consultants
www.coffmanassociates.com

02/26/19 - 10:24am - ljohnson - R:\CAD\Johnson\Projects\abq-2016ALP\Abq-sht5-12_AS_profiles.dwg

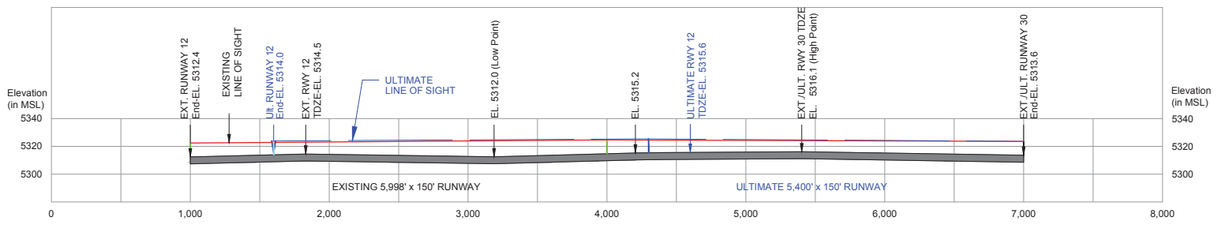
RUNWAY 12 APPROACH PROFILE



RUNWAY 30 APPROACH PROFILE

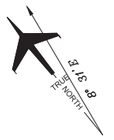


RUNWAY 12-30 PROFILE



GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
5. City of Albuquerque Integrated Development Ordinance Part 14-16-3.3 Airport Protection Overlay Zone requires landuse at or around public airport facilities comfy with FAA regulations that protect the public from noise, vibration, and hazard impacts of airport operations and that protect the safety of aircraft operations.
6. Date of Obstruction Survey: 7/13/2010



Magnetic Declination
8° 31'East (March 2018)
Annual Rate of Change 6' West

RUNWAY 12 OBSTRUCTION TABLE

Object Description	Object Elevation	Obstructed Part 77 Surface	Surface Elevation	Object Penetration	Proposed Object Disposition
NONE FOUND					

RUNWAY 30 OBSTRUCTION TABLE

Object Description	Object Elevation	Obstructed Part 77 Surface	Surface Elevation	Object Penetration	Proposed Object Disposition
NONE FOUND					

Supplemental Data Provided By:

..\COFFMAN\Molzen logo.jpg

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

RUNWAY 12-30 PART 77
APPROACH SURFACE PROFILES

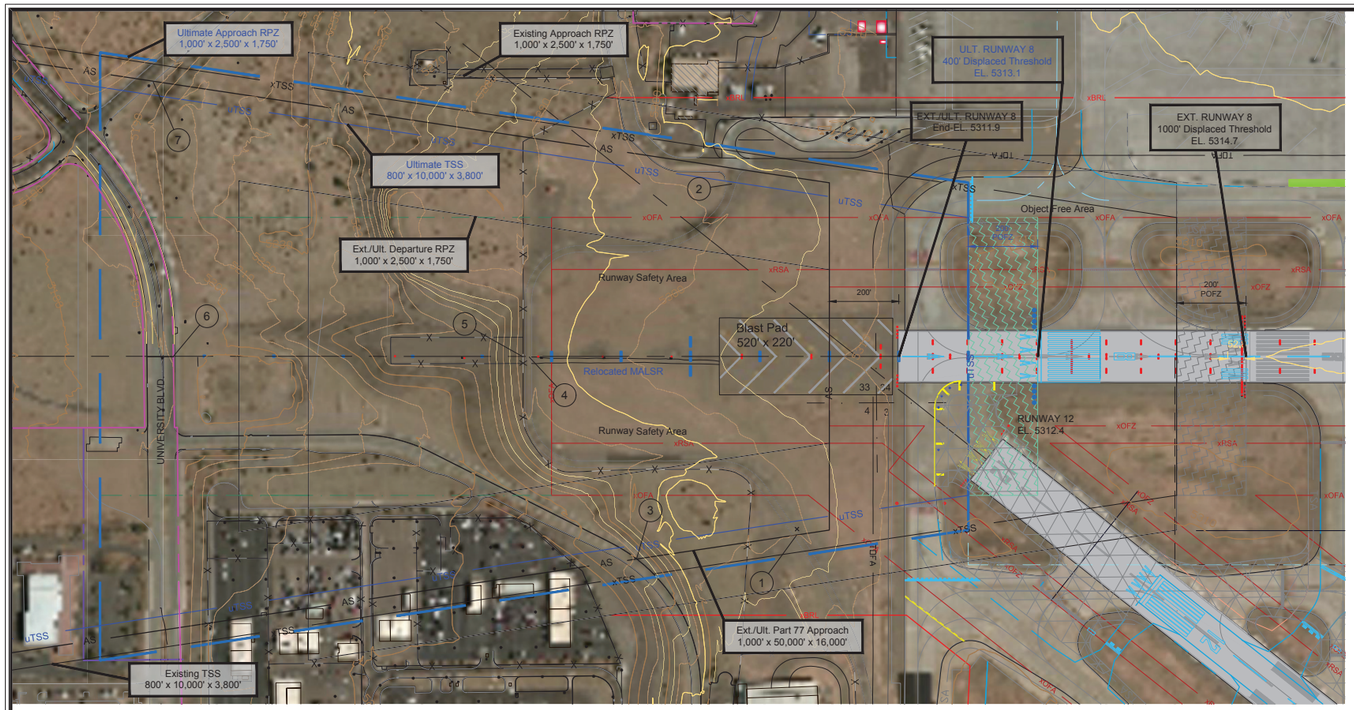
Albuquerque, New Mexico

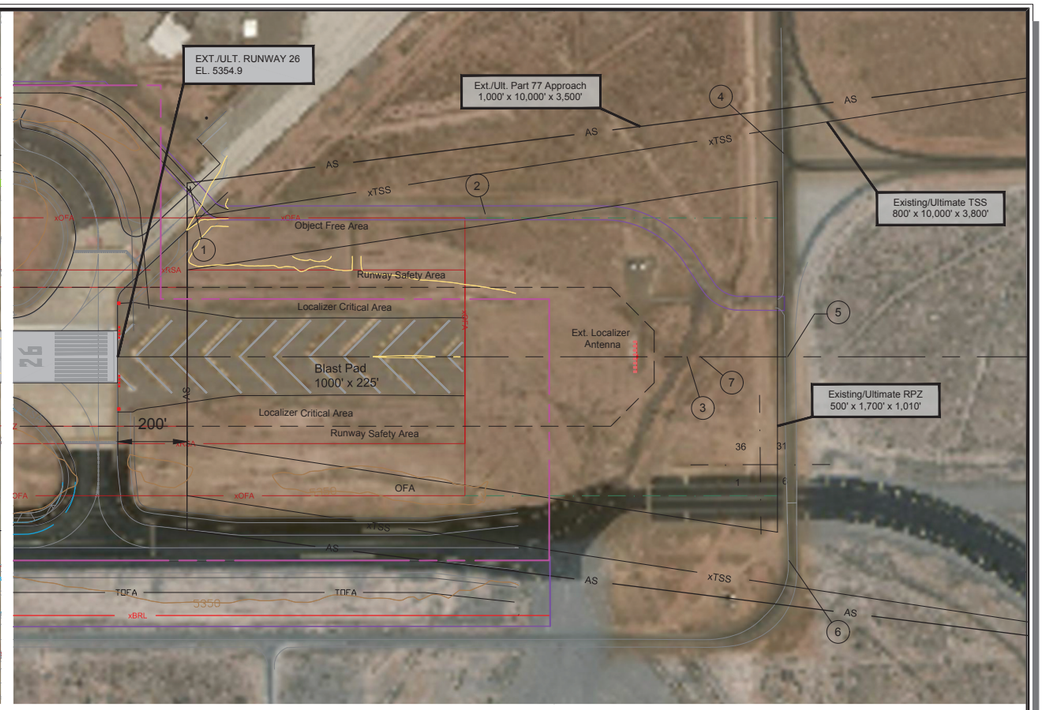
PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Steven G. Benson, P.E.

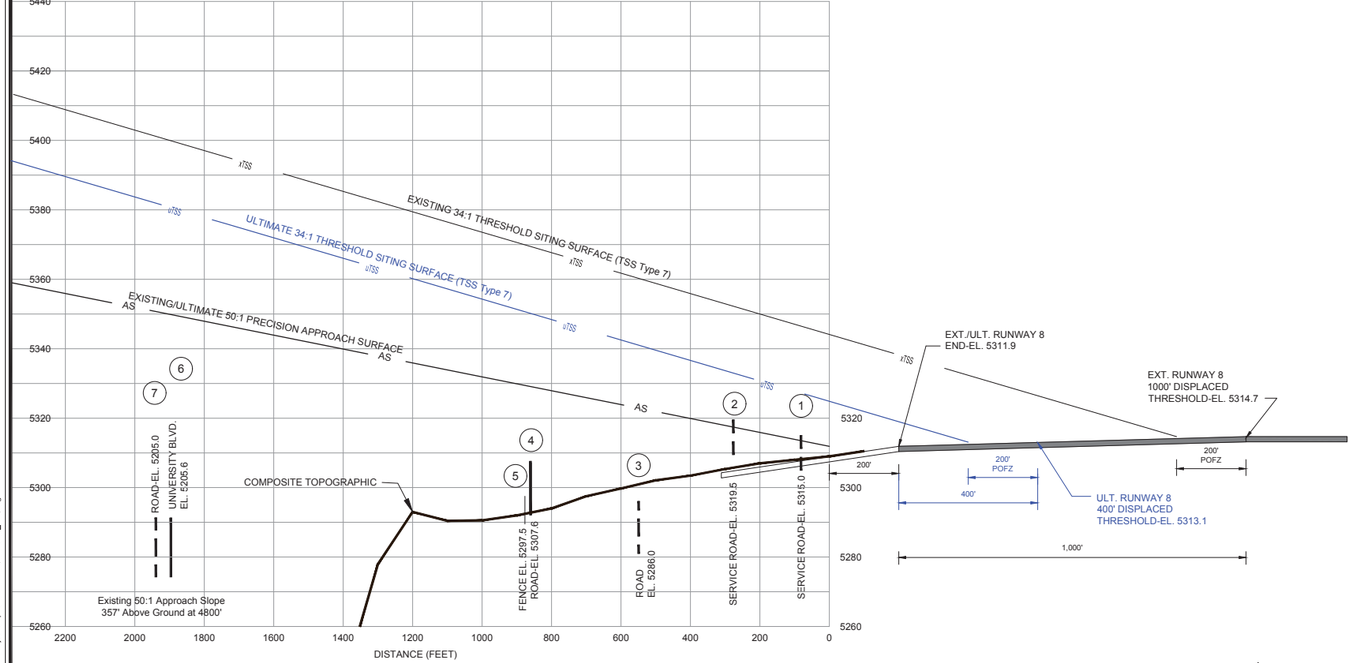
August 21, 2018 | SHEET 12 OF 23

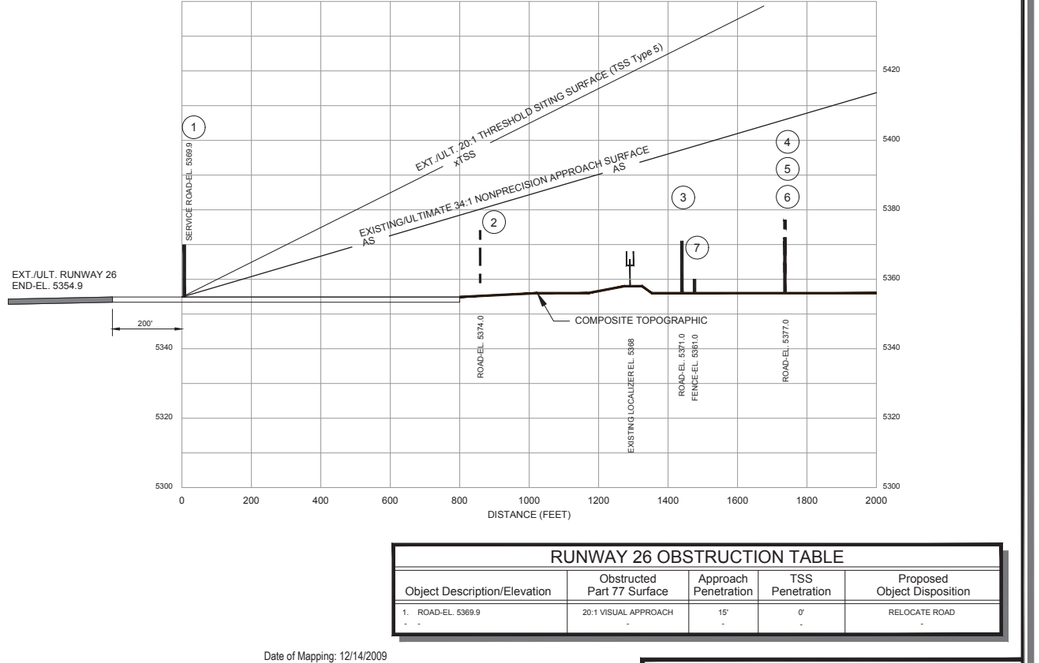
Coffman Associates
Airport Consultants
www.coffmanassociates.com

02/26/19 - 10:23am - ljohnson - R:\CAD\Johnson\Projects\abq-2016\ALP\Abq-sht05-12_XS_profiles.dwg









RUNWAY 8 OBSTRUCTION TABLE

Object Description/Elevation	Obstructed Part 77 Surface	Approach Penetration	TSS Penetration	Proposed Object Disposition
1. SERVICE ROAD-EL. 5315.0	50:1 PRECISION APPROACH	2'	0'	NO ACTION (Displaced Threshold)
2. SERVICE ROAD-EL. 5319.5	50:1 PRECISION APPROACH	2'	0'	NO ACTION (Displaced Threshold)

RUNWAY 26 OBSTRUCTION TABLE

Object Description/Elevation	Obstructed Part 77 Surface	Approach Penetration	TSS Penetration	Proposed Object Disposition
1. ROAD-EL. 5369.9	20:1 VISUAL APPROACH	15'	0'	RELOCATE ROAD
- -	-	-	-	-

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted. Road obstructions reflect a safety clearance of 10' for dirt roads or private roads, 15' for noninterstate roads, 17' for interstate roads, and 23' for railroad. Existing and future height and hazard ordinances are to be amended and/or referenced upon approval of updated AIRPORT AIRSPACE DRAWING.
2. Depiction of features and objects within the primary, transitional, and horizontal Part 77 surfaces, is illustrated on the AIRPORT AIRSPACE DRAWING.

Magnetic Declination
8° 31'East (March 2018)
Annual Rate of Change 6' West

TRUE NORTH 8° 31' E

HORIZONTAL SCALE IN FEET 0 200 400 600
VERTICAL SCALE IN FEET 0 20 40 60

Supplemental Data Provided By:
..\COFFMAN\Molzen logo.jpg

Date of Mapping: 12/14/2009
Date of Obstruction Survey: 7/13/2010

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

INNER PORTION OF RUNWAY 8-26 APPROACH SURFACE DRAWING

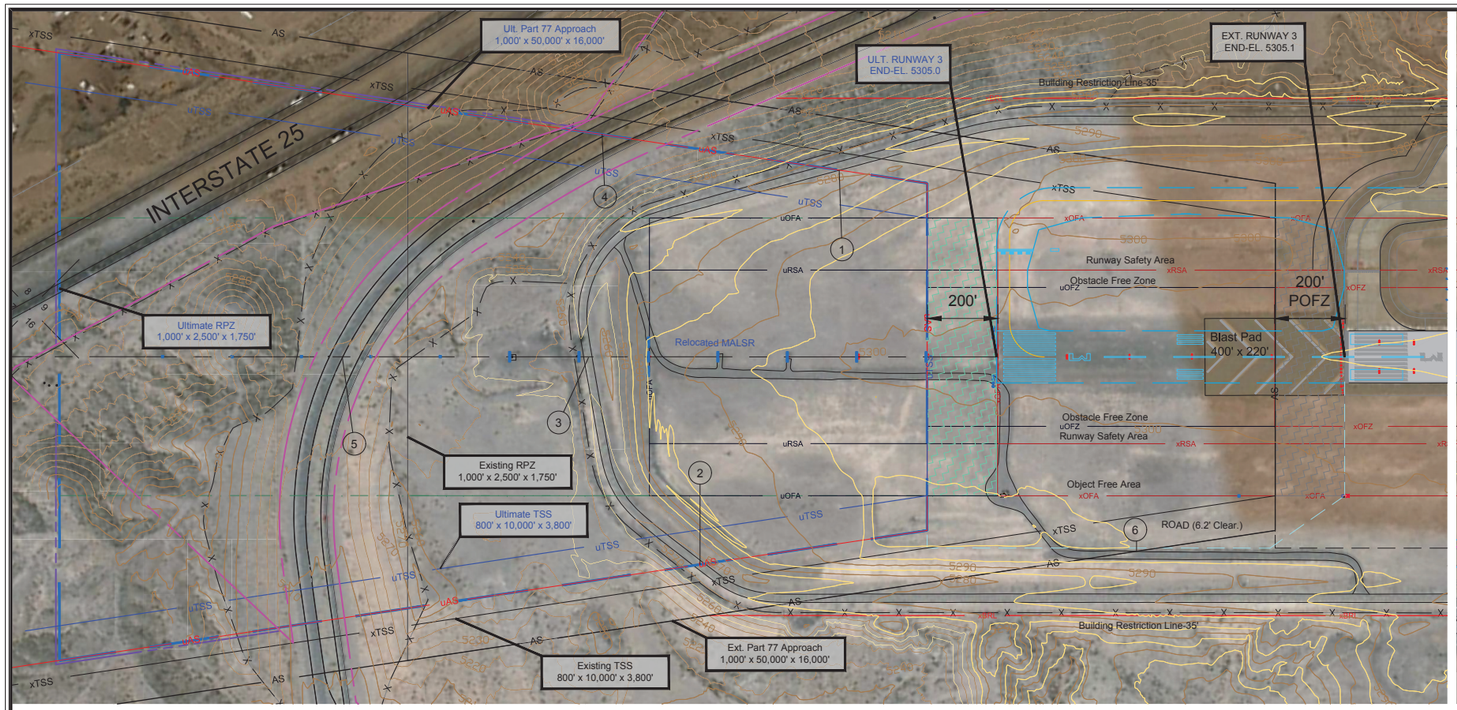
Albuquerque, New Mexico

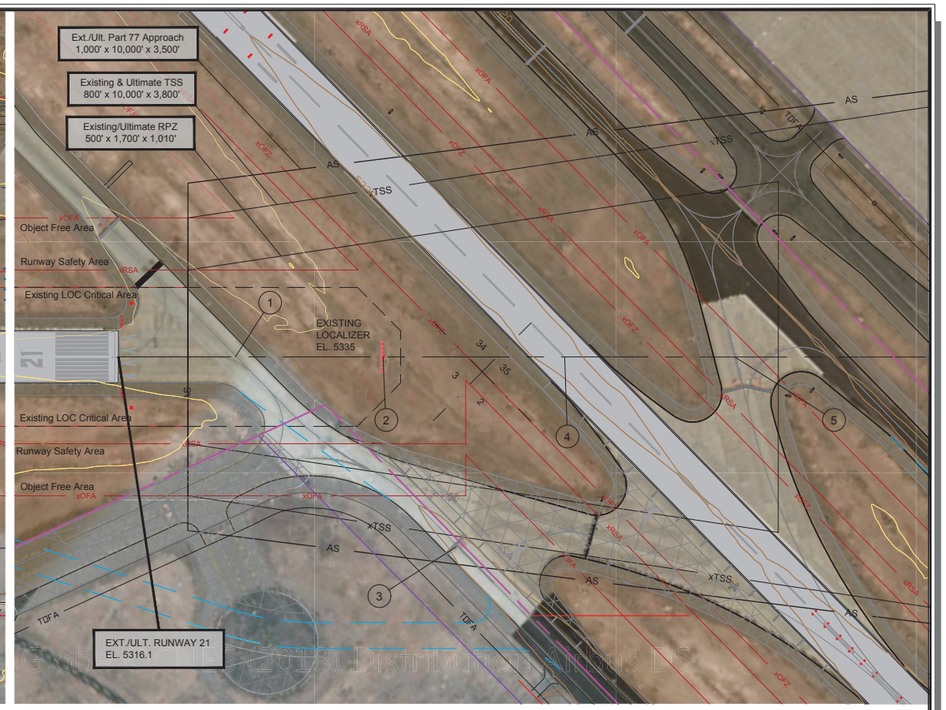
PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Steven G. Benson, P.E.

August 21, 2018 | SHEET 13 OF 23

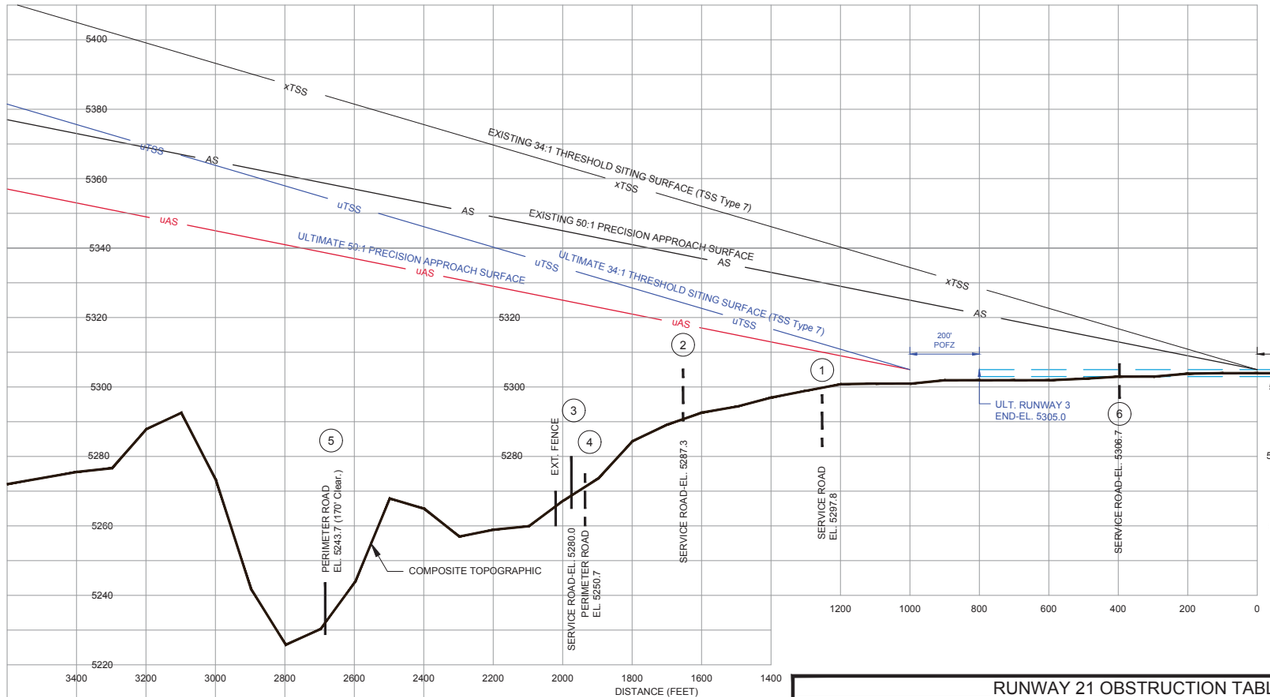
Coffman Associates
Airport Consultants
www.coffmanassociates.com

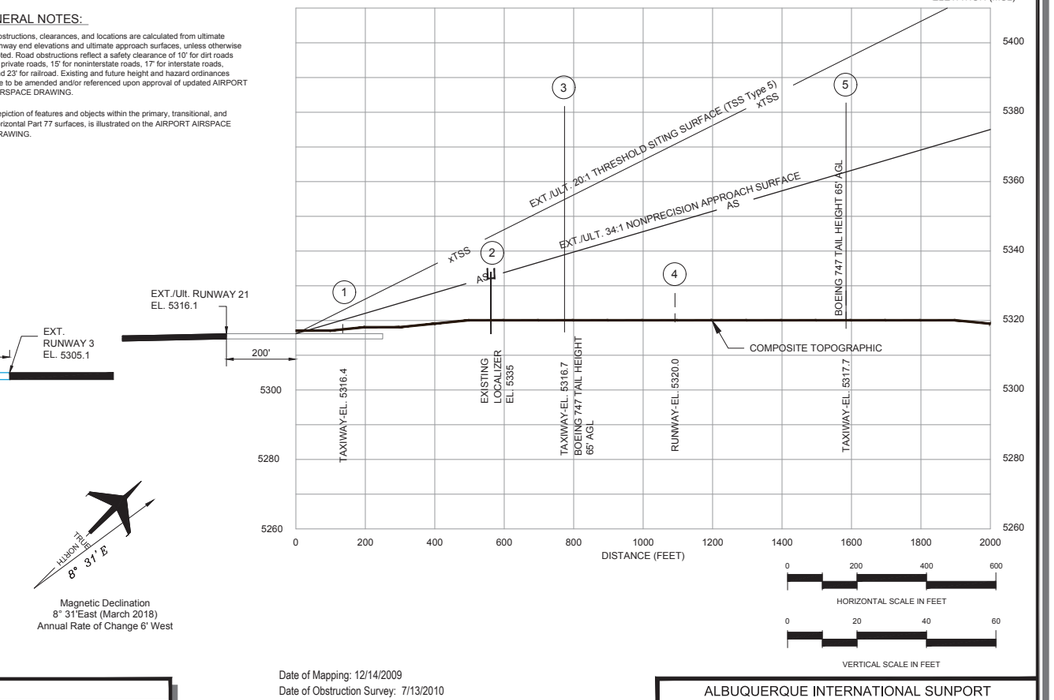
02/26/19 - 10:48am - kjohnson - R:\CAD\Johnson\Projects\abq-20\16ALP\ABQ-alp15-16_INS.dwg





Copyright © 2010 Distribution Airspace LLC





GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted. Road obstructions reflect a safety clearance of 10' for dirt roads or private roads, 15' for noninterstate roads, 17' for interstate roads, and 23' for railroad. Existing and future height and hazard ordinances are to be amended and/or referenced upon approval of updated AIRPORT AIRSPACE DRAWING.
2. Depiction of features and objects within the primary, transitional, and horizontal Part 77 surfaces, is illustrated on the AIRPORT AIRSPACE DRAWING.

RUNWAY 3 OBSTRUCTION TABLE

Object Description/Elevation	Obstructed Part 77 Surface	Approach Penetration	TSS Penetration	Proposed Object Disposition
NONE	-	-	-	-

RUNWAY 21 OBSTRUCTION TABLE

Object Description/Elevation	Obstructed Part 77 Surface	Approach Penetration	TSS Penetration	Proposed Object Disposition
2. LOCALIZER ANTENNA EL. 5335	34:1 APPROACH	2.6'	0'	To Remain Lighted
3. BOEING 747 TAIL HEIGHT 65' AGL	34:1 APPROACH	43'	0'	ABQ-MOD-04-001 (Sept. 8, 2004)
5. BOEING 747 TAIL HEIGHT 65' AGL	34:1 APPROACH	20'	0'	ABQ-MOD-04-001 (Sept. 8, 2004)

Supplemental Data Provided By:

..\COFFMAN\Molzen logo.jpg

Date of Mapping: 12/14/2009
Date of Obstruction Survey: 7/13/2010

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

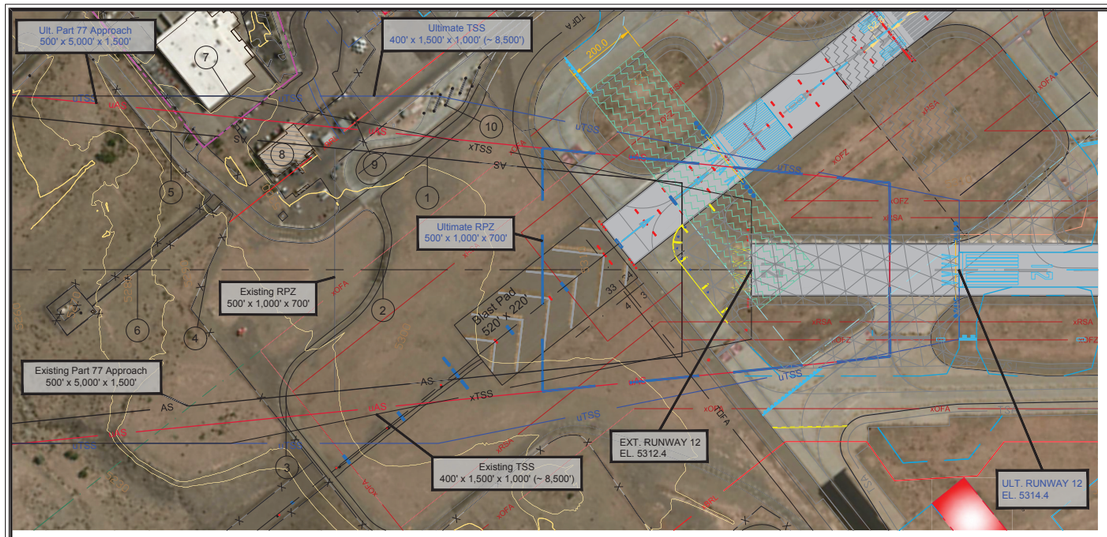
INNER PORTION OF RUNWAY 3-21 APPROACH SURFACE DRAWING

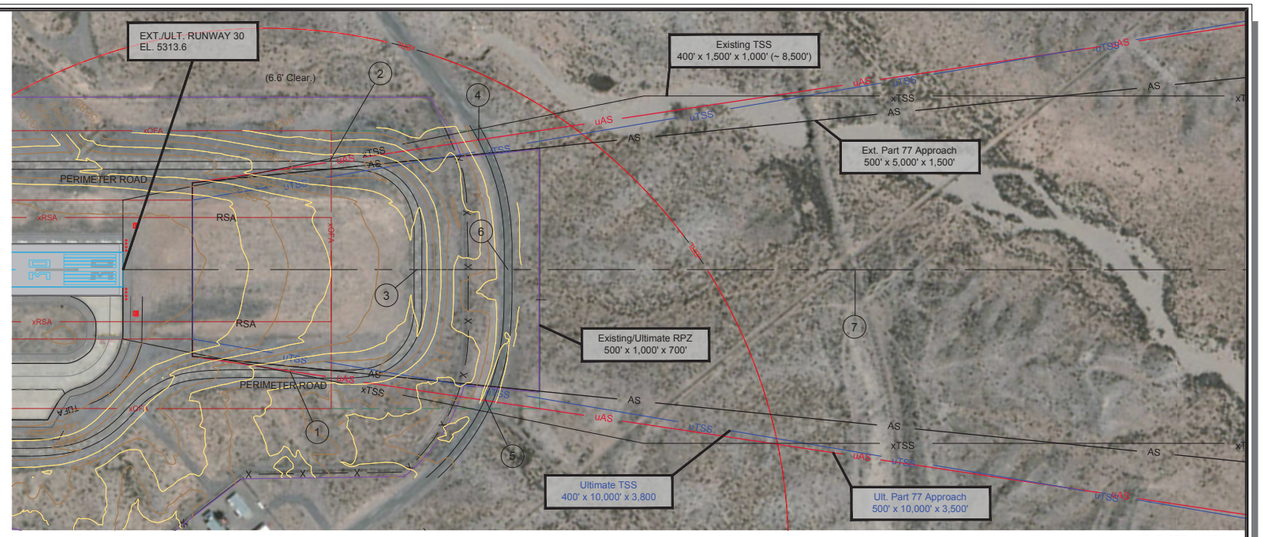
Albuquerque, New Mexico

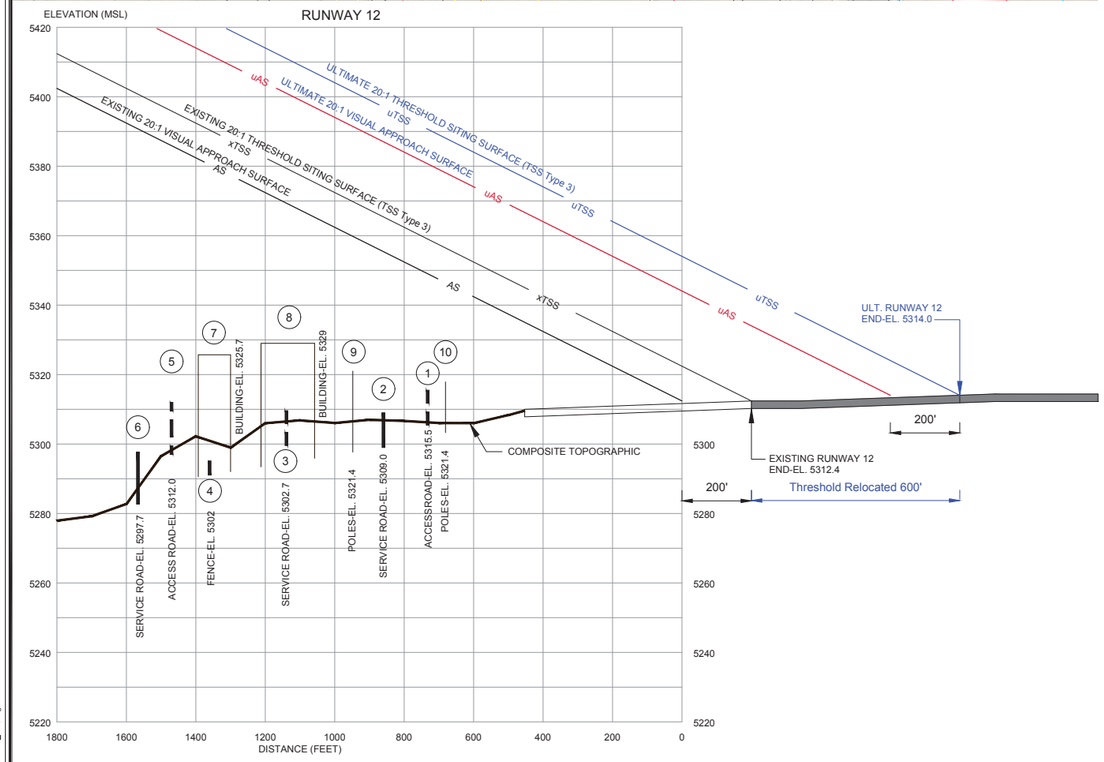
PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Steven G. Benson, P.E.
August 21, 2018
SHEET 14 OF 23

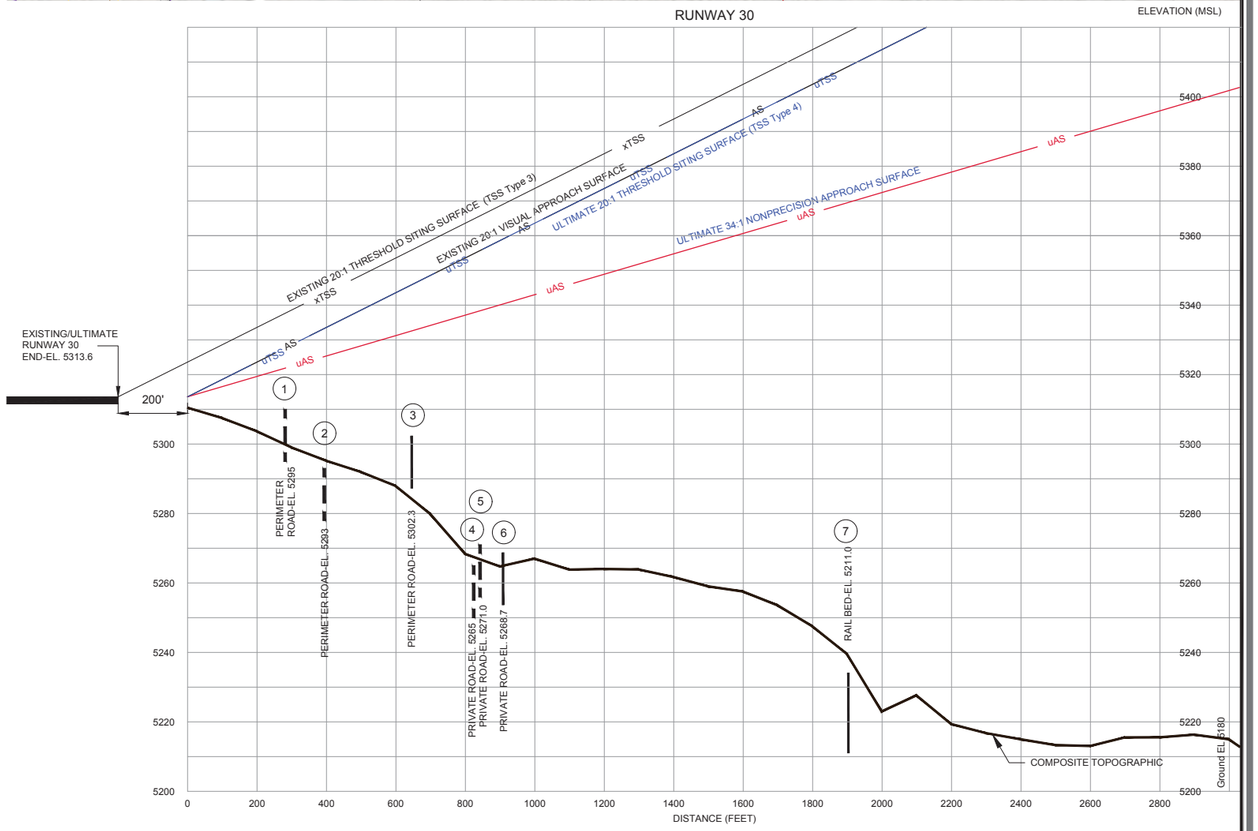
Coffman Associates
Airport Consultants
www.coffmanassociates.com

02/26/19 - 10:48am - tjohnson - R:\CAD\Johnson\Projects\abq-2010\ALP\ABQ-alp15-15_ALS.dwg









RUNWAY 12 OBSTRUCTION TABLE

Object Description/Elevation	Obstructed Part 77 Surface	Approach Penetration	AC 5300-13 CHG 18 TSS Penetration	Proposed Object Disposition
NONE	-	-	-	-

RUNWAY 30 OBSTRUCTION TABLE

Object Description/Elevation	Obstructed Part 77 Surface	Approach Penetration	AC 5300-13 CHG 18 TSS Penetration	Proposed Object Disposition
NONE	-	-	-	-

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted. Road obstructions reflect a safety clearance of 10' for dirt roads or private roads, 15' for noninterstate roads, 17' for interstate roads, and 23' for railroad. Existing and future height and hazard ordinances are to be amended and/or referenced upon approval of updated AIRPORT AIRSPACE DRAWING.
2. Depiction of features and objects within the primary, transitional, and horizontal Part 77 surfaces, is illustrated on the AIRPORT AIRSPACE DRAWING.

8° 37' E TRUE NORTH

Magnetic Declination
8° 31'East (March 2018)
Annual Rate of Change 6' West

HORIZONTAL SCALE IN FEET: 0, 200, 400, 600

VERTICAL SCALE IN FEET: 0, 20, 40, 60

Supplemental Data Provided By:
..\COFFMAN\Molzen logo.jpg

Date of Mapping: 12/14/2009
Date of Obstruction Survey: 7/13/2010

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

INNER PORTION OF RUNWAY 12-30 APPROACH SURFACE DRAWING

Albuquerque, New Mexico

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Steven G. Benson, P.E.

August 21, 2018 | SHEET 15 OF 23

Coffman Associates
Airport Consultants
www.coffmanassociates.com

02/26/ 19 - 10:50am - ljohnson - R:\CAD\Johnson\Projects\dwg-2016\ALP\ABQ-sht13-15_ALS.dwg

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
N/A		ULTIMATE ROAD
	Same	ABANDONED PAVEMENT (To Be Removed)
	Same	ABANDONED BUILDING (To Be Removed)
		BUILDING
	Same	DRAINAGE
		PAVEMENT FACILITY CONSTRUCTION
5300	Same	TOPOGRAPHY (Date of Mapping: 12/14/2009)
		AIRPORT PROPERTY LINE
BRL		BUILDING RESTRICTION LINE (BRL)

EXISTING BUILDINGS/FACILITIES

	DESCRIPTION	Elevation
1	TERMINAL BUILDING	5363.7
2	E TERMINAL RENTAL SPACE	5324.1
3	SNOW BARN BUILDING	-
4	PATHOGEN DESTRUCTOR TRITURATOR & WASH BAYS	-
5	WASTE COLLECTION SYSTEM	-
6	REFUELOR STATION / CONTROL BUILDING	0.0
7	PROVISION BUILDING (To Be Removed)	5334.8
8	US POSTAL FACILITY	5333.5
9	ORIGINAL TERMINAL BUILDING	5348.6
10	AIR FREIGHT BUILDING (To Be Removed)	5346.4
11	PARKING STRUCTURE	5327.2
12	HOTEL	5432.1
13	2700 YALE RENTAL BUILDING	5265.3
14	RENTAL CAR SHUTTLE BUS SERVICE and STORAGE	5309.0
15	PARKS & RECREATION SATELLITE	5322.1
16	PARKING STRUCTURE ADMINISTRATION	5306.7
17	PARKING FEE BOOTH	5302.1

ULT. BUILDINGS/FACILITIES

	DESCRIPTION
73	WASTE COLLECTION
74	TRITURATER
75	WASH STATION
76	GLYCOL STORAGE
77	AIRLINE SERVICE BUILDING
78	OFFICE BUILDING
79	ARFF

GENERAL NOTES:

1. Depiction of features and objects, including related elevations and clearances, within the Federal Aviation Regulations (FAR) Part 77 Approach Surface are depicted on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
2. Details concerning terminal improvements are depicted on the TERMINAL AREA DRAWINGS.
3. Vertical Datum NAVD-88 and Horizontal Datum NAD-83.

Magnetic Declination
8° 31'East (March 2018)
Annual Rate of Change 6' West

0 200 400 600
SCALE IN FEET

TRUE NORTH 8° 31' E

Supplemental Data Provided By:
..\COFFMAN\Molzen logo.jpg

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

AIRLINE TERMINAL AREA DRAWING

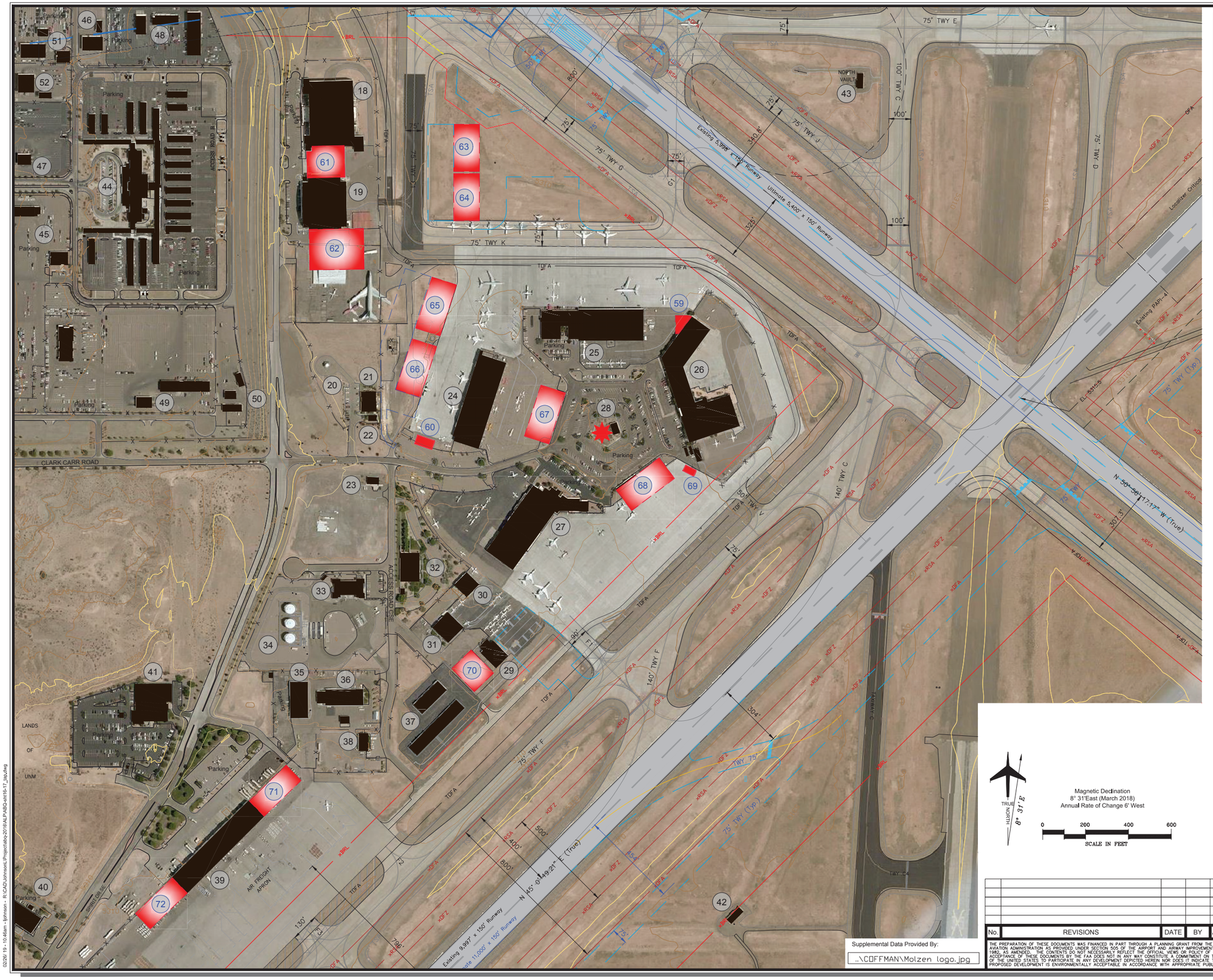
Albuquerque, New Mexico

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Steven G. Benson, P.E.

August 21, 2018 SHEET 16 OF 23

Coffman Associates
Airport Consultants
www.coffmanassociates.com

02/20/19 - 10:45am - ljohnson - R:\CAD\Johnson\Projects\dcp-2018\ALP\ABD-alt15-17_tlg.dwg



LEGEND

EXISTING	ULTIMATE	DESCRIPTION
N/A		ULTIMATE ROAD
	Same	ABANDONED PAVEMENT (To Be Removed)
	Same	ABANDONED BUILDING (To Be Removed)
	Same	AIRPORT ROTATING BEACON
		BUILDING
	Same	DRAINAGE
		PAVEMENT FACILITY CONSTRUCTION
PAPI-4	PAPI-4	NAVIGATIONAL AID INSTALLATION
REIL	REIL	RUNWAY END IDENTIFICATION LIGHTS
		RUNWAY THRESHOLD LIGHTS
34 | 35 / 17 | 12	Same	SECTION CORNER
5300	Same	TOPOGRAPHY (Date of Mapping: 12/14/2009)
		HOLDING POSITION MARKING
	Same	DIRT ROAD
	Same	FENCING
		AIRPORT PROPERTY LINE
BRL		BUILDING RESTRICTION LINE (BRL)
xOFA	uOFA	OBJECT FREE AREA
xRSA	uRSA	RUNWAY SAFETY AREA
xOFZ	uOFZ	OBSTACLE FREE ZONE

EXISTING BUILDINGS/FACILITIES

	DESCRIPTION	Elevation
18	ECLIPSE HANGAR III, PAINT	5377.9
19	ECLIPSE HANGAR II, ASSEMBLY	5379.1
20	NWS INFLATION BUILDING	5314.9
21	NATIONAL WEATHER SERVICE	5328.3
22	NWS GENERATOR BUILDING	5320.6
23	NEW MEXICO DOT-AVIATION DIVISION	
24	CUTTER W. HANGER	5342.9
25	CUTTER FBO	5365.5
26	ECLIPSE HANGAR I, HQ	5343.1
27	ATLANTIC AVIATION	5352.3
28	AIRPORT BEACON/SGA VAULT	5367.5
29	ECLIPSE HANGAR IV, CUSTOMER SERVICE	5339.4
30	FOUR SEASONS NORTH HANGAR	5331.4
31	FOUR SEASONS	5338.6
32	FAA/AFSS	5331.8
33	ASIG FUEL FARM	5343.8
34	FUEL STORAGE TANKS	5333.2
35	VEHICLE STORAGE BUILDING	5333.8
36	AIRFIELD MAINTENANCE	5337.0
37	AVIATION DEPARTMENT, T-HANGARS	5331.2
38	FLEET MAINTENANCE	5333.4
39	AIR CARGO BUILDING	5348.3
40	NANOPORE INSULATION	5345.6
41	SWA RESERVATION CENTER	5331.4
42	SOUTH VAULT	5326.9
43	NORTH VAULT	5324.5
44	RENTAL CAR TERMINAL	5282.0
45	HERTZ CORPORATION BLDG G, H, I, and JJ	5247.8
46	THRIFTY CAR RENTAL-BUILDING T	5266.0
47	AVIS AUTO RENTAL-BUILDINGS C, E and F	5254.8
48	BUDGET RENT-A-CAR BUILDING Q, Rand S	5266.9
49	ALAMO/NATIONAL/NANGUARDBUILDINGS K, Land M	5267.4
50	ADVANTAGE RENT-A-CAR BUILDINGS N, 0 and P	5275.8
51	DOLLAR RENTAL-A-CAR BUILDINGS A and B	5258.4
52	ENTERPRISE RENT-A-CAR BUILDING D	5256.0

ULT. BUILDINGS/FACILITIES

	DESCRIPTION
59	GA FUEL FACILITY
60	GA FUEL FACILITY
61	HANGAR
62	HANGAR
63	HANGAR (General Aviation)
64	HANGAR (General Aviation)
65	HANGAR (General Aviation)
66	HANGAR (General Aviation)
67	HANGAR (General Aviation)
68	HANGAR (General Aviation)
69	GA FUEL FACILITY
70	HANGAR
71	AIR CARGO BUILDING EXPANSION
72	AIR CARGO BUILDING EXPANSION

TRUE NORTH

8° 37' E

Magnetic Declination
8° 31'East (March 2018)
Annual Rate of Change 6' West

0 200 400 600
SCALE IN FEET

Supplemental Data Provided By:
..\COFFMAN\Molzen logo.jpg

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

SOUTH GENERAL AVIATION / AIR CARGO AREA DRAWING

Albuquerque, New Mexico

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Steven G. Benson, P.E.

August 21, 2018 SHEET 17 OF 23

Coffman Associates
Airport Consultants
www.coffmanassociates.com

02/26/ 19 - 10:46am - ljohnson - R:\CAD\Johnson_Projectsfiles\2016\ALP\ABQ-sht15-17_tab.dwg

SEE INSET-A

Residential

Parks / Rec.

Residential

Commercial /Industrial

65 CNEL

EXISTING and ULTIMATE RUNWAY 12
RPZ 500' x 1000' x 700'
(OWNED FEE SIMPLE)
VISUAL VISIBILITY MINIMUMS
20:1 APPROACH

EXISTING RUNWAY 8
RPZ 1,000' x 2,500' x 1,750'
DEPARTURE RPZ
500' x 1700' x 1010'
(OWNED FEE SIMPLE)
1/2 MILE VISIBILITY MINIMUMS
50:1 APPROACH

ULTIMATE RUNWAY 8
RPZ 1,000' x 2,500' x 1,750'
DEPARTURE RPZ
500' x 1700' x 1010'
(OWNED FEE SIMPLE)
1/2 MILE VISIBILITY MINIMUMS
50:1 APPROACH

Ext./Ult. Runway 8
End-EL. 5311.9

Ultimate Runway 8
Displaced Threshold
EL. 5313.1

Ext. Runway 12
End-EL. 5312.4

Existing Runway 8
Displaced Threshold
EL. 5314.7

Ult. Runway 12
End-EL. 5314.0

Existing Runway 3
EL. 5305.1

Ultimate Runway 3
EL. 5305.0

CLARK CARR ROAD

Parks / Recreation

Commercial /Industrial

Residential

Industrial

Commercial/Industrial

65 CNEL

CS

TA

GA

AC

AV

OS

AS

APRON E

MILITARY OPERATIONS AREA

ATCT

AIRPORT SURVEILLANCE RADAR

AIRPORT ROTATING BEACON

ARFF SOUTH SAT.

ARFF NORTH SAT.

EXISTING/ULTIMATE RUNWAY 21
RPZ 500' x 1700' x 1010'
OWNED FEE SIMPLE
1 1/2 MILE VISIBILITY MINIMUMS
34:1 APPROACH

KIRTLAND AIR FORCE

Ext./Ult. Runway 21
End-EL. 5316.1

Ext./Ult. Runway 30
End-EL. 5313.6

RUNWAY 30
EXT./ULT. 500' x 1000' x 700' RPZ
VISIBILITY MINIMUMS VISUAL
ULTIMATE
VISIBILITY MINIMUMS 1-MILE
(OWNED FEE SIMPLE)

RUNWAY 3
EXISTING 1,000' x 2,500' x 1,750' RPZ
PARTIALLY OWNED (FEE/EASEMENT)
ULTIMATE 1,000' x 2,500' x 1,750' RPZ
OWNED FEE SIMPLE
VISIBILITY MINIMUMS 1/2 MILE

VA Medical Center

Public / Institutional

OPEN SPACE

Commercial /Industrial

Commercial /Industrial

Residential

Commercial /Industrial

Commercial /Industrial

Commercial /Industrial

Residential

Commercial /Industrial

EXISTING/ULTIMATE RUNWAY 26
RPZ 500' x 1700' x 1010'
PARTIALLY OWNED IN FEE/EASEMENT
1 1/4 MILE VISIBILITY MINIMUMS
34:1 APPROACH

Ext./Ult. Runway 26
End-EL. 5354.9

KIRTLAND ROAD

OPEN SPACE

RUNWAY 26
SEE INSET-B

INSET-A

INSET-A

RUNWAY 26
INSET-B

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
5. City of Albuquerque Integrated Development Ordinance Part 14-16-3.3 Airport Protection Overlay Zone requires landuse at or around public airport facilities comfy with FAA regulations that protect the public from noise, vibration, and hazard impacts of airport operations and that protect the safety of aircraft operations.

0 1000 2000 3000

SCALE IN FEET

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
N/A		ULTIMATE ROAD
	SAME	ABANDONED (To Be Removed)
	SAME	ABANDONED BUILDING (To Be Removed)
	SAME	AIRPORT ROTATING BEACON
		BUILDING
	SAME	DRAINAGE
		PAVEMENT FACILITY CONSTRUCTION
PAPI-4	PAPI-4	NAVIGATIONAL AID INSTALLATION
REIL	REIL	RUNWAY END IDENTIFICATION LIGHTS
		RUNWAY THRESHOLD LIGHTS
34.135 111'	SAME	SECTION CORNER
5350	SAME	TOPOGRAPHY (Date of Mapping: 12/14/2009)
		HOLDING POSITION MARKING
	SAME	DIRT ROAD
		FENCING
		AIRPORT PROPERTY LINE
BRL		BUILDING RESTRICTION LINE (BRL)
EXTD OFA		EXTENDED OFA
		PARCELS
xOFA	uOFA	OBJECT FREE AREA
xRSA	uRSA	RUNWAY SAFETY AREA
xOFZ	uOFZ	OBSTACLE FREE ZONE
		MALSR APPROACH LIGHT SYSTEM (Existing)
		MALSR APPROACH LIGHT SYSTEM (Ultimate)
		RUNWAY PROTECTION ZONE (RPZ)
		GLIDE SLOPE ANTENNA
xGS	uGS	GLIDE SLOPE CRITICAL AREA
	SAME	LOCALIZER ANTENNA
xLOC	SAME	LOC CRITICAL AREA
VASI-6	SAME	NAVIGATIONAL AID INSTALLATION (VASI-6)
		PRECISION OBSTACLE FREE ZONE (POFZ)

TRUE NORTH

8° 31' E

Magnetic Declination
8° 31'East (March 2018)
Annual Rate of Change 6' West

Date of Mapping: 12/14/2009

Supplemental Data Provided By:

..\COFFMAN\Molzen logo.jpg

65 2016 Community Noise Exposure Level (CNEL 65)

AIRPORT LAND USE LEGEND

- AV — AVIATION (AIRFIELD OPERATIONS)
- TA — PASSENGER TERMINAL AREA (PASSENGER RELATED ACTIVITIES)
- AC — AIR CARGO OPERATION AREA (AIR CARGO RELATED ACTIVITIES)
- GA — GENERAL AVIATION AREA
- AS — AIRFIELD SUPPORT
- CS — AIRPORT COMMERCIAL SUPPORT
- OS — OPEN SPACE

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

ON-AIRPORT LAND USE DRAWING

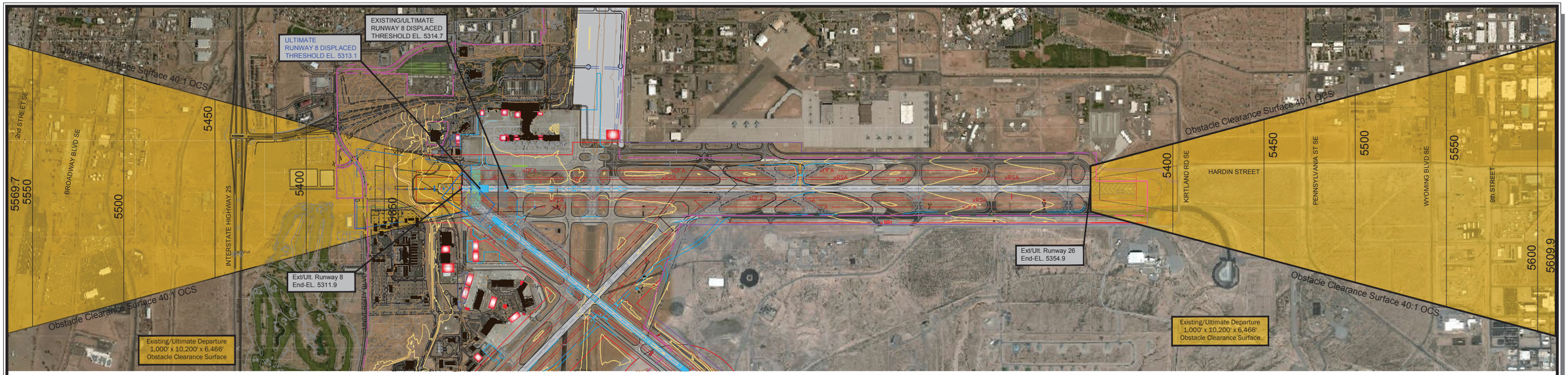
Albuquerque, New Mexico

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Steven G. Benson, P.E.

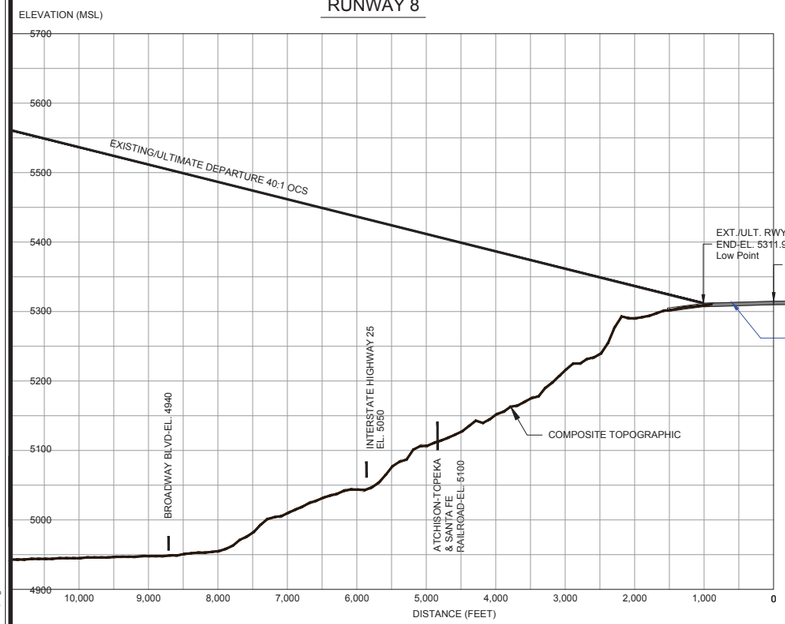
August 21, 2018 | SHEET 18 OF 23

Coffman Associates
Airport Consultants
www.coffmanassociates.com

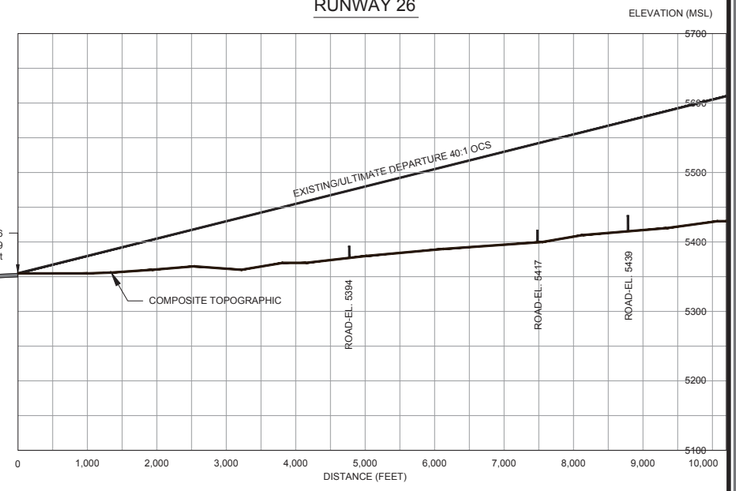
02/26/19 - 10:51am - johnson - R:\CADD\Johnson\Projects\abq-2016\ALP\abq-alp18_lup.dwg



RUNWAY 8



RUNWAY 26



RUNWAY 8 OBSTRUCTION TABLE			
Object Description and Elevation	Obstructed Departure Surface	Object Penetration	Proposed Object Disposition
NONE FOUND			

RUNWAY 26 OBSTRUCTION TABLE			
Object Description and Elevation	Obstructed Departure Surface	Object Penetration	Proposed Object Disposition
NONE FOUND			

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
5. Roads and Buildings Clearance of more than 50 feet AGL are not detail in Departure Surface Profiles.

Magnetic Declination
8° 31' East (March 2018)
Annual Rate of Change 6' West

0 1000 2000 3000
HORIZONTAL SCALE IN FEET

0 100 200 300
VERTICAL SCALE IN FEET

Date of Mapping: 12/14/2009
Date of Obstruction Survey: 7/13/2010

Supplemental Data Provided By:

..\COFFMAN\Molzen logo.jpg

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

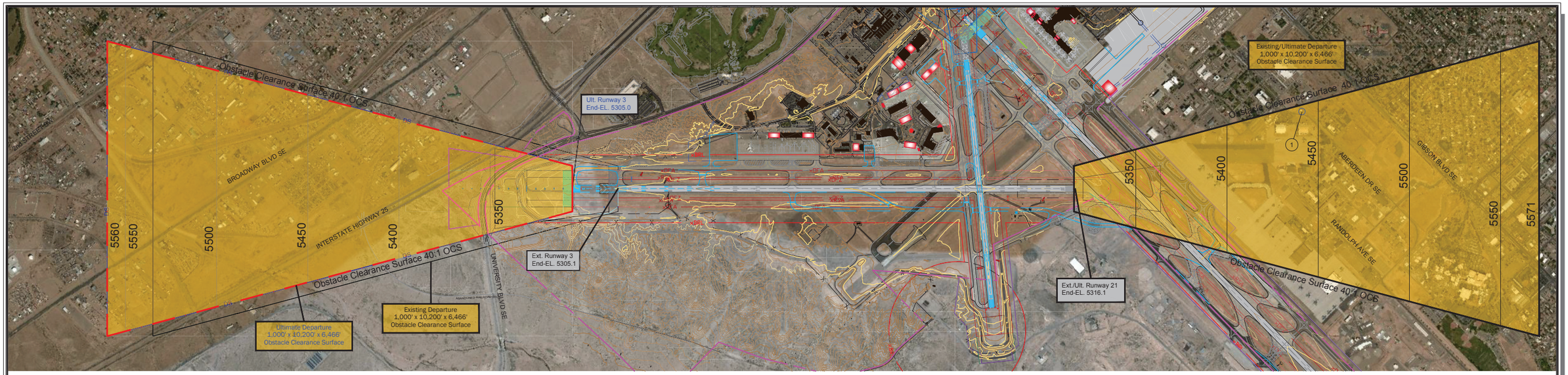
RUNWAY 8-26
DEPARTURE SURFACE DRAWING

Albuquerque, New Mexico

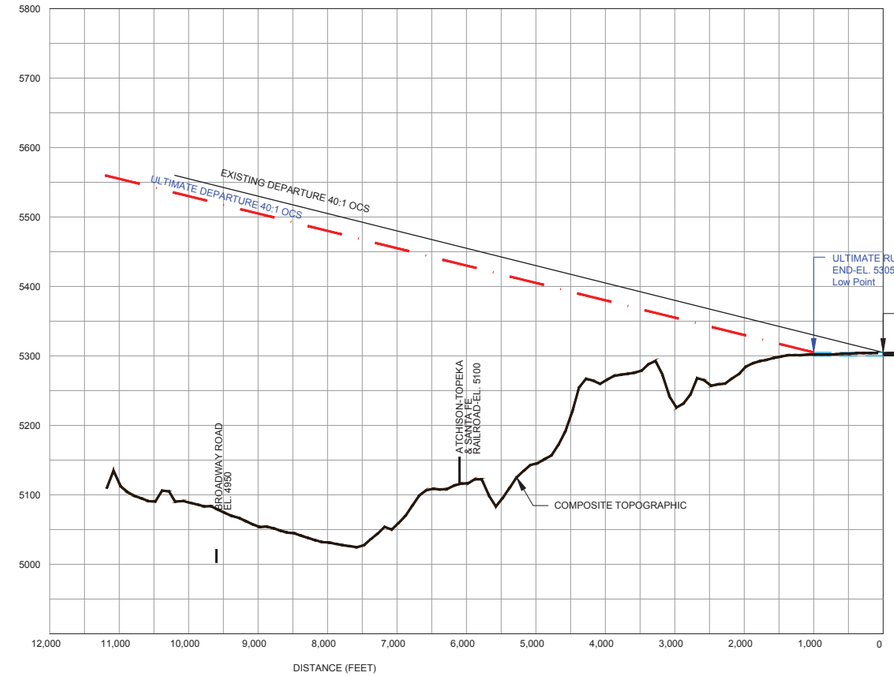
PLANNED BY:	Patrick C. Taylor
DETAILED BY:	Larry D. Johnson
APPROVED BY:	Steven G. Benson, P.E.
August 21, 2018	SHEET 19 OF 23

Coffman Associates
Airport Consultants
www.coffmanassociates.com

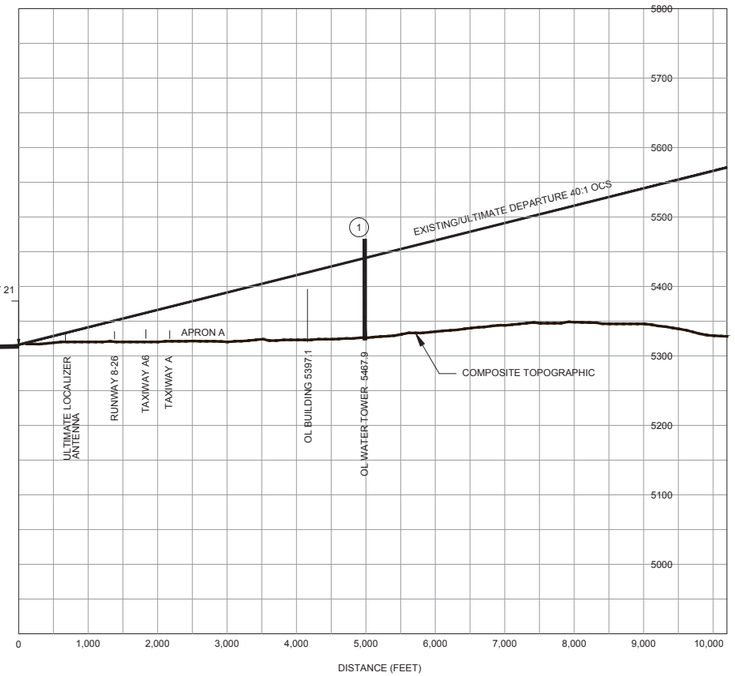
02/20/19 - 10:52am - tjohnson - R:\CAD\Johnson\Projects\abq-2018\ALP\Abq-alp110_Rwy8-26_departure.dwg



RUNWAY 3



RUNWAY 21



RUNWAY 3 OBSTRUCTION TABLE

Object Description and Elevation	Obstructed Departure Surface	Object Penetration	Proposed Object Disposition
NONE FOUND			

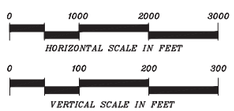
RUNWAY 21 OBSTRUCTION TABLE

Object Description and Elevation	Obstructed Departure Surface	Object Penetration	Proposed Object Disposition
1. WATER TOWER-EL 5467.9	40:1 Departure Surface	27.8'	NO ACTION

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
5. Roads and Buildings Clearance of more than 50 feet AGL are not detail in Departure Surface Profiles.

Magnetic Declination
8° 31' East (March 2018)
Annual Rate of Change 6' West



Date of Mapping: 12/14/2009
Date of Obstruction Survey: 7/13/2010

Supplemental Data Provided By:

..\COFFMAN\Molzen logo.jpg

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

RUNWAY 3-21
DEPARTURE SURFACE DRAWING

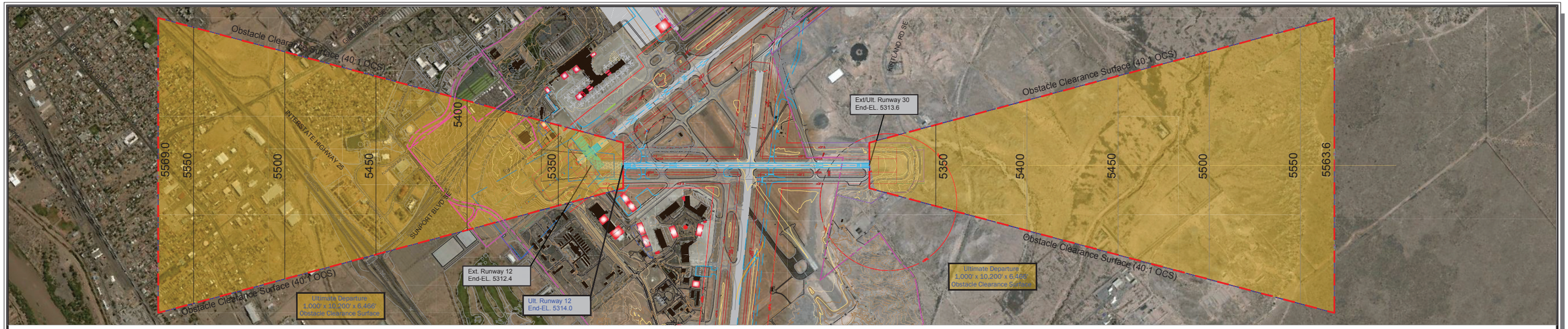
Albuquerque, New Mexico

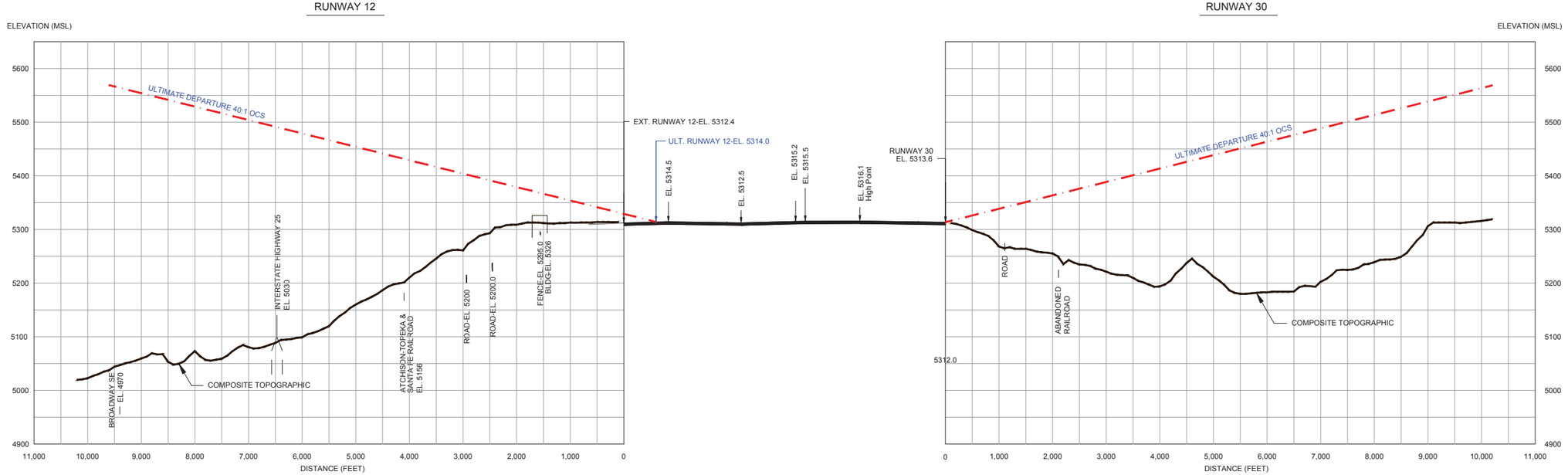
PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Steven G. Benson, P.E.

August 21, 2018 | SHEET 20 OF 23

Coffman Associates
Airport Consultants
www.coffmanassociates.com

02/26 19 - 10:52am - ljohnson - R:\CAD\Johnson\Projects\abq-2016\ALP\Abq-alp20_Rwy3-21_departure.dwg



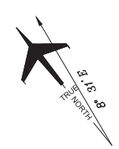


RUNWAY 12 OBSTRUCTION TABLE			
Object Description and Elevation	Obstructed Departure Surface	Object Penetration	Proposed Object Disposition
NONE FOUND			

RUNWAY 30 OBSTRUCTION TABLE			
Object Description and Elevation	Obstructed Departure Surface	Object Penetration	Proposed Object Disposition
NONE FOUND			

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
5. Roads and Buildings Clearance of more than 50 feet AGL are not detail in Departure Surface Profiles.



Magnetic Declination
8° 31' East (March 2018)
Annual Rate of Change 6' West

0 1000 2000 3000
HORIZONTAL SCALE IN FEET

0 100 200 300
VERTICAL SCALE IN FEET

Date of Mapping: 12/14/2009
Date of Obstruction Survey: 7/13/2010

Supplemental Data Provided By:

..\COFFMAN\Molzen logo.jpg

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

RUNWAY 12-30
DEPARTURE SURFACE DRAWING

Albuquerque, New Mexico

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Steven G. Benson, P.E.

August 21, 2018 SHEET 21 OF 23

Coffman Associates
Airport Consultants
www.coffmanassociates.com

02/26/ 19 - 10:53am - ljohnson - R:\CAD\Johnson\Projects\faa-2016\ALP\Abs-#1621-rw12-30_departure.dwg

LINE TABLE			LINE TABLE(RECORD)	
LINE	BEARING	LENGTH	BEARING	LENGTH
L1	N00°08'03"W	75.49		
L2	N88°41'01"W	66.10		
L3	N79°35'55"W	338.42	(S79°56'00"E)	(338.50)
L4	S47°27'10"W	101.10	(N47°07'00"E)	(101.10)
L5	N89°47'49"W	83.51	(S89°38'00"W)	(91.50)
L6	S00°12'19"W	25.00	(N00°22'00"W)	(25.00)
L7	N89°47'41"W	142.00	(N89°38'00"E)	(142.00)
L8	S00°12'19"W	49.95		
L9	S89°47'41"E	142.00	(S89°38'00"W)	(142.00)
L10	S00°12'19"W	25.05		
L11	S89°47'49"E	83.51	(S89°38'00"W)	(91.50)
L12	N47°27'10"E	101.10	(S47°07'00"W)	(101.10)
L13	S79°35'55"E	338.42	(N79°56'00"W)	(338.50)
L14	S49°41'59"W	6.46	(S49°42'36"W)	(6.46)
L15	N89°40'22"W	105.15	(N89°39'45"W)	(105.80)
L16	N00°23'53"W	594.83	(N00°17'24"W)	(594.10)
L17	S40°19'50"E	217.79	(S40°17'24"E)	(218.46)
L18	S89°40'22"E	105.15	(S89°39'45"E)	
L19	N49°41'59"E	5.81	(N49°42'36"E)	(5.81)
L20	S00°18'01"E	277.86		(280.41)
L21	S00°02'18"E	208.53		
L22	N89°18'58"E	208.65		
L23	S56°02'04"E	290.00	(N56°02'04"W)	(290.00)
L24	N33°57'56"E	230.00	(S33°57'56"W)	(230.00)
L25	N56°02'04"W	290.00	(S56°02'04"E)	(290.00)
L26	S33°57'56"W	230.00	(N33°57'56"E)	(230.00)
L27	S52°52'43"E	220.36	(N52°52'43"W)	
L28	S13°28'26"W	224.64	(N13°28'26"E)	(224.64)
L29	S21°20'58"W	833.97	(N21°20'58"E)	(833.97)
L30	S30°45'20"W	78.59	(N30°45'20"E)	(78.59)
L31	N00°57'23"E	17.37		
L32	S88°55'20"E	78.14		
L35	N00°02'49"W	298.46	(N00°01'31"W)	(297.81)
L36	S89°50'01"E	479.74	(S89°50'01"E)	(479.31)
L37	N03°44'00"E	4.22	(N03°48'25"E)	(4.21)
L38	S89°49'15"E	30.06	(S89°49'15"E)	(30.06)
L39	N03°53'01"E	59.64	(N03°53'01"E)	(59.64)
L40	N89°52'08"W	30.07	(N89°52'08"W)	(30.07)
L41	S11°58'41"E	24.22	(S11°58'41"E)	(24.22)
L42	S30°11'00"W	627.80	(S30°11'19"W)	(627.78)
L43	N00°09'00"W	30.54	(N00°21'36"W)	(40.75)
L45	N58°28'45"W	32.44	(N58°42'29"W)	(25.00)
L46	N00°06'28"E	33.23		
L47	N00°05'22"E	8.75	(N00°06'08"E)	(8.76)
L48	N10°11'56"E	69.30	(N10°11'56"E)	(69.30)
L49	N00°07'16"E	40.00	(N00°07'16"E)	(40.00)
L50	S89°52'44"E	5.00	(S89°52'44"E)	(5.00)
L51	N00°07'16"E	20.00	(N00°07'16"E)	(20.00)
L52	N89°52'44"W	5.00	(N89°52'44"W)	(5.00)
L53	N10°00'33"W	69.32	(N10°00'33"W)	(69.32)
L54	N00°06'08"E	18.67	(N00°06'08"E)	(18.67)
L55	N89°37'55"W	8.06		
L56	N88°53'43"W	136.01		
L57	S00°27'49"W	83.04	(S00°27'00"W)	
L58	S89°38'04"E	200.01		(200.00)
L59	S00°31'37"W	270.76	(S00°27'00"W)	(270.00)
L60	N89°32'44"W	199.71		(200.00)
L61	N00°27'49"E	270.45	(S00°27'00"W)	(270.00)
L62	S89°33'30"E	150.10		(150.00)
L63	S00°27'49"W	269.82	(S00°27'00"W)	(270.00)
L64	N89°33'50"W	150.10		(150.00)
L65	N00°27'49"E	269.84	(S00°27'00"W)	(270.00)
L66	S89°33'30"E	100.20		
L67	S00°27'49"W	269.42	(S00°27'00"W)	(270.00)
L68	N89°31'27"W	100.20		
L69	N00°27'49"E	269.36	(S00°27'00"W)	(270.00)
L70	S89°33'30"E	70.16		
L71	S00°27'49"W	135.08	(S00°27'00"W)	(135.00)
L72	N89°29'41"W	10.00		
L73	S00°30'49"W	134.96	(S00°27'00"W)	(135.00)
L74	N89°25'53"W	60.04		
L75	N00°27'49"E	269.89	(S00°27'00"W)	(270.00)
L76	S89°33'30"E	50.00		
L77	S00°27'49"W	248.35	(S00°27'00"W)	
L78	N88°51'37"W	50.00		
L79	N00°27'49"E	247.74	(S00°27'00"W)	
L80	S89°54'03"E	72.66	(S89°59'42"E)	(69.11)
L81	S88°40'46"E	50.01		
L82	N00°07'00"W	29.77		
L83	N16°23'57"E	41.95		
L84	N49°01'15"E	488.01		
L85	N35°28'26"E	307.55		
L86	N26°37'35"E	375.49		
L87	N37°18'44"E	412.60		
L88	N29°38'23"E	906.27		
L89	N44°56'55"E	1913.34		
L90	N47°37'43"W	193.60		
L91	N58°53'49"W	77.19		
L92	N30°50'25"W	193.72		
L93	N32°39'12"W	476.49		
L94	N89°11'41"E	585.72		
L95	N73°44'01"E	475.71		
L96	N89°36'26"E	348.14		
L97	N28°13'06"E	199.48		
L98	N90°00'00"E	158.35		
L99	N00°35'45"E	543.02		
L100	N22°06'13"E	162.92		
L101	N00°19'23"E	90.28		
L102	N18°56'41"W	426.82		
L103	N32°53'22"W	197.22		
L104	N18°10'48"W	290.63		
L105	S81°01'43"W	228.28		
L106	N18°20'59"W	842.84		
L107	N89°16'49"E	91.37		
L108	S00°44'07"E	85.29		
L109	S89°16'40"W	68.47		

CURVE TABLE							CURVE TABLE(RECORD)		
CURVE	DELTA	RADIUS	LENGTH	TANGENT	CHORD BEARING	CHORD	DELTA	RADIUS	LENGTH
C1	40°13'07"	666.74	468.02	244.12	S80°17'31"W	458.47	(40°13'50")	(666.74)	(468.16)
C2	53°01'52"	652.75	604.16	325.67	S73°56'47"W	582.83	(52°57'00")	(653.79)	(604.19)
C3	42°45'14"	1226.98	915.57	480.28	S68°49'42"W	894.47	(42°31'00")	(1223.56)	(907.95)
C4	42°45'14"	1326.98	990.19	519.42	N68°49'42"E	967.38		(1323.56)	
C5	53°02'25"	552.80	511.74	275.86	N73°57'00"E	493.67	(52°57'00")	(553.79)	(511.79)
C6	41°39'11"	766.74	557.41	291.66	N79°34'29"E	545.21		(766.74)	
C7	90°38'25"	60.00	94.92	60.67	S04°22'46"W	85.33	(90°00'00")	(60.00)	(94.25)
C8	40°37'39"	270.00	191.45	99.95	S70°00'48"W	187.47	(40°37'39")	(270.00)	(191.45)
C9	21°40'32"	843.12	318.96	161.41	S29°27'45"E	317.06	21°40'32"	(843.00)	(318.11)
C10	40°37'39"	330.00	234.00	122.16	N70°00'48"E	229.13	(40°37'39")	(330.00)	(234.00)
C11	92°28'01"	60.00	96.83	62.64	S84°04'00"E	86.66	(92°28'01")	(60.00)	(96.83)
C12	37°31'59"	757.00	495.89	257.21	S19°04'00"E	487.07		(757.00)	
C13	66°15'56"	1078.00	1246.76	703.62	S19°39'32"E	1178.43	(66°15'56")	(1078.00)	(1246.77)
C14	7°52'32"	2578.00	354.36	177.46	S17°24'42"W	354.08	(7°52'32")	(2578.00)	(354.35)
C15	9°24'23"	1178.00	193.40	96.92	S26°03'09"W	193.18	(9°24'23")	(1178.00)	(182.22)
C16	90°14'53"	100.00	157.51	100.43	S14°22'06"E	141.73	(90°14'53")	(100.00)	(157.51)
C17	22°43'35"	1023.30	405.89	205.65	S69°28'08"E	403.23		(1023.00)	
C19	259°14'16"	55.00	248.85	66.44	N50°20'03"E	84.73			
C20	12°06'48"	1209.98	255.81	128.38	N06°03'50"E	255.34	(12°05'19")	(1209.98)	(255.29)
C21	78°02'44"	25.00	34.05	20.26	N51°08'37"E	31.48	(77°55'03")	(25.00)	(34.00)
C22	15°30'00"	954.93	258.33	129.96	S04°13'41"E	257.55	(15°29'59")	(954.93)	(258.33)
C23	42°10'57"	572.96	421.83	220.99	S09°06'47"W	412.36	(42°37'38")	(573.64)	(426.78)
C24	12°26'32"	954.61	207.30	104.06	S23°56'32"W	206.89	(12°26'22")	(954.61)	(207.25)
C25	6°43'23"	2825.00	331.49	165.93	S61°50'54"W	331.30	(6°44'17")	(2664.79)	(313.38)
C26	66°15'56"	922.00	1066.34	601.80	N19°39'32"W	1007.90	(66°21'09")	(922.00)	(1067.74)
C27	7°52'32"	2422.00	332.91	166.72	N17°24'42"E	332.65	(7°52'32")	(2422.00)	(332.92)
C28	9°24'23"	1022.00	167.78	84.08	N26°03'09"E	167.60	(9°24'21")	(1022.00)	(167.77)
C29	5°44'16"	3861.85	386.75	193.53	N28°39'57"E	386.58			
C30	25°41'21"	5782.58	2592.68	1318.50	N12°57'08"E	2571.02			
C31	40°00'00"	843.00	588.53	306.83	N20°18'01"W	576.65	(40°00'00")	(843.00)	(588.53)
C32	22°30'22"	724.00	284.39	144.05	N11°33'12"W	282.57			
C33	71°49'56"	25.00	31.34	18.11	N38°55'58"E	29.33	(71°49'23")	(25.00)	(31.34)
C34	120°00'00"	40.00	83.78	69.28	S00°27'49"W	69.28			
C35	65°17'35"	334.12	380.75		N03°00'24"W	360.48			
C36	15°18'56"	980.00	261.96		N37°17'27"E	261.18			
C37	42°22'48"	757.00	559.93	293.47	N21°29'25"W	547.25			
C38	88°24'58"	25.00	38.58		S45°04'11"W	34.86			

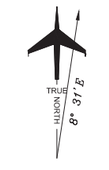
TRACT TIES TO CONTROL MONUMENTS	
TIE NO.	
T1	N28°38'56"E, 4422.82' FROM MONUMENT "I-25-31"
T2	S20°05'51"W, 13,273.76' FROM MONUMENT "KIRKLAND-3"
T3	N01°48'10"E, 702.94' FROM MONUMENT "19-L16"
T4	N67°59'05"E, 172.39' FROM MONUMENT G-7A"
T5	N08°07'32"E, 1647.17' FROM MONUMENT "G-7A"
T6	N10°03'00"E, 1320.41' FROM MONUMENT "G-7A"
T7	N13°12'07"E, 996.76' FROM MONUMENT "G-7A"
T8	N19°18'55"E, 679.36' FROM MONUMENT "G-7A"
T9	N35°31'01"E, 382.28' FROM MONUMENT "G-7A"
T10	S07°10'06"W, 985.11' FROM MONUMENT "19-L16"
T11	N28°15'49"E, 4492.26' FROM MONUMENT "I-25-31"
T12	N49°11'01"E, 2759.32' FROM MONUMENT "I-25-31"
T13	N40°17'41"E, 3223.18' FROM MONUMENT "I-25-31"
T14	S00°37'28"E, 6361.37' FROM MONUMENT "I-25-31"
T15	S21°05'38"W, 13,368.79' FROM MONUMENT "KIRKLAND-3"
T16	S71°22'12"E, 4200.18' FROM MONUMENT "I-25-31"
T17	S06°47'19"W, 5446.70' FROM MONUMENT "KIRKLAND-3"
T18	S41°58'14"E, 4527.74' FROM MONUMENT "I-25-31"

NEW MEXICO COORDINATE SYSTEM, CENTRAL ZONE CONTROL MONUMENTS		
DESIGNATION	*NAD 27/NGVD 29 DATA	**NAD 83/NAVD 88 DATA
"I-25-31" (NMSHC)	N: 1470261.57 E: 384123.93 ELEV: 5062.528 G-G FACTOR: 0.99967323 △○00°13'20"	N: 1470324.85 E: 1524369.62 ELEV: 5065.20 G-G FACTOR: 0.99967321 △○00°13'21.4"
"G-7A"(ACS)	N: 1476657.56 E: 392629.11 ELEV: 5320.093 G-G FACTOR: 0.9996587 △○00°12'22"	N: 1476720.81 E: 1532874.76 ELEV: 5322.83 G-G FACTOR: 0.99965872 △○00°12'23.1"
"19-L16"(ACS)	N: 1478628.94 E: 391509.99 ELEV: 5294.836 G-G FACTOR: 0.9996602 △○00°12'30"	N: 1478692.19 E: 1531755.64 ELEV: 5297.56 G-G FACTOR: 0.99966020 △○00°12'31.0"
"KIRKLAND-3"(ACS)	N: 1473296.86 E: 389482.30 ELEV: 5314.96 G-G FACTOR: 0.9996598 : -00°12'43"	N: 1473360.13 E: 1529727.97 ELEV: 5317.68 G-G FACTOR: 0.99991402 △○00°12'44.6"

* OFFICIAL CONTROL MONUMENT DATA PUBLISHED BY THE CITY OF ALBUQUERQUE SURVEY SECTION

** PROJECT SURVEY DATA DERIVED BY FIELD OBSERVATION OR BY CONVERSION PROGRAM "CORPSCON".

TRACT	GRANTOR	ACREAGE	Date Recorded	Book & Page	PROPERTY INTEREST	COMMENTS	Federal Project No.	GRANTEE
TRACT A		2337.6	10/9/1980	BK C17, PG 99-1&2	TRACT A			CITY OF ALBUQUERQUE AIRPORT
	KIRTLAND AIR FORCE BASE		4/27/1984	D210A, PG 350-351	PARCEL A, TRACT 30, 31, 32			
			4/27/1984	D210A, PG 350-351	PARCEL B, TRACT 33, 34, 35			
			4/27/1984	D210A, PG 349	PARCEL C, PARCEL C1 & PARCEL C2			
			11/22/1985	D256A, PG 67	PARCEL E			
			6/12/1986	BK C30, PG 146	TRACT A-1, TRACT A-4	MUNICIPAL ADDITION NO. 9		
			2/25/1992	BK 92C, PG 27	TRACT G-1	MUNICIPAL ADDITION NO. 9		
			2/15/1993	BK 93C, PG 40	TRACT D-1-A-1, TRACT D-1-A-2	CITY OF ALBUQUERQUE AIRPORT		
			6/25/1998	BK 9811, PG 7436	UNIVERSITY BLVD EXTENSION	CITY OF ALBUQUERQUE AIRPORT		
			3/9/2001	BK 2001C, PG 72	TRACT E-1	MUNICIPAL ADDITION NO. 9		
			2/5/1965	BK D3, PG 106	TRACT C (Parcel 4, 5, 6)	MUNICIPAL ADDITION NO. 9		
			5/25/1983	BK C21, PG 82	TRACT C (Tract 26, 27, 36)	AIRPORT BUSINESS PARK		
			10/7/1996	BK 96C, PG 421	TRACT A-1-C	AIRPORT PARK		
TRACT B		72.36	1/11/1926	BK B2, PG 52	TRACT B (Tract 17 & 19)	KNOB HEIGHTS BLOCK 21 & PORTION OF BLOCK 17		CITY OF ALBUQUERQUE AIRPORT
			2/5/1965	BK D3, PG 106	TRACT B (Tract 1)	MUNICIPAL ADDITION NO. 9		
			10/5/1965	BK C6,PG 89	TRACT B (Tract 24, 25)	SUNPORT LODGINGS ADDITION		
TRACT C		1.98						
TRACT D		1.24						CITY OF ALBUQUERQUE AIRPORT
TRACT E		0.93						CITY OF ALBUQUERQUE AIRPORT
TRACT F		0.62						CITY OF ALBUQUERQUE AIRPORT
TRACT G		0.4						CITY OF ALBUQUERQUE AIRPORT
TRACT H		0.28						CITY OF ALBUQUERQUE AIRPORT
TRACT J		6.07						CITY OF ALBUQUERQUE AIRPORT
TRACT K		2.22	1/18/1996	BK 96C, PG 22	PARCEL 2A			CITY OF ALBUQUERQUE AIRPORT
TRACT L		8.71	6/12/1986	BK C30, PG 146	RACT A-2 & A-3	MUNICIPAL ADDITION NO. 9		CITY OF ALBUQUERQUE AIRPORT
TRACT M		24.92						CITY OF ALBUQUERQUE AIRPORT
EASEMENT-1		11.22	2/5/1965	BK D3, PG 106	AVIGATION EASEMENT	(Tract 9, 10, 11)		
			6/26/1978	BK C13, PG 134	EASEMENT (SUNPORT LODGINGS ADDITION)	(Tract 2, 3)		
LEASE 1		52.61			RUNWAY 30 EXTENSION/RPZ	KIRTLAND AIR FORCE (KAFB)		
LEASE 2		45.58			TAXIWAY E	KIRTLAND AIR FORCE (KAFB)		
LEASE 3 & 4		31.01			TAXIWAY B	KIRTLAND AIR FORCE (KAFB)		
LEASE 5		14.61			PERIMETER ROAD/FENCE	KIRTLAND AIR FORCE (KAFB)		
LEASE 6		2.28			PERIMETER ROAD/FENCE	KIRTLAND AIR FORCE (KAFB)		



Magnetic Declination
8° 31'East (March 2018)
Annual Rate of Change 6' West

NOTES:
1. ALL DATA IN PARENTHESES ARE RECORD DATA.

2. LINES L82 THROUGH L106 AND CURVES C35, C36 LISTED ABOVE ARE CENTERLINE OF EASEMENTS GRANTED BY THIS PLAT.

FOR APPROVAL BY:

Nyika A. Allen
Director

DATE:

Supplemental Data Provided By:

..\COFFMAN\Molzen logo.jpg

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

AIRPORT PROPERTY DATA

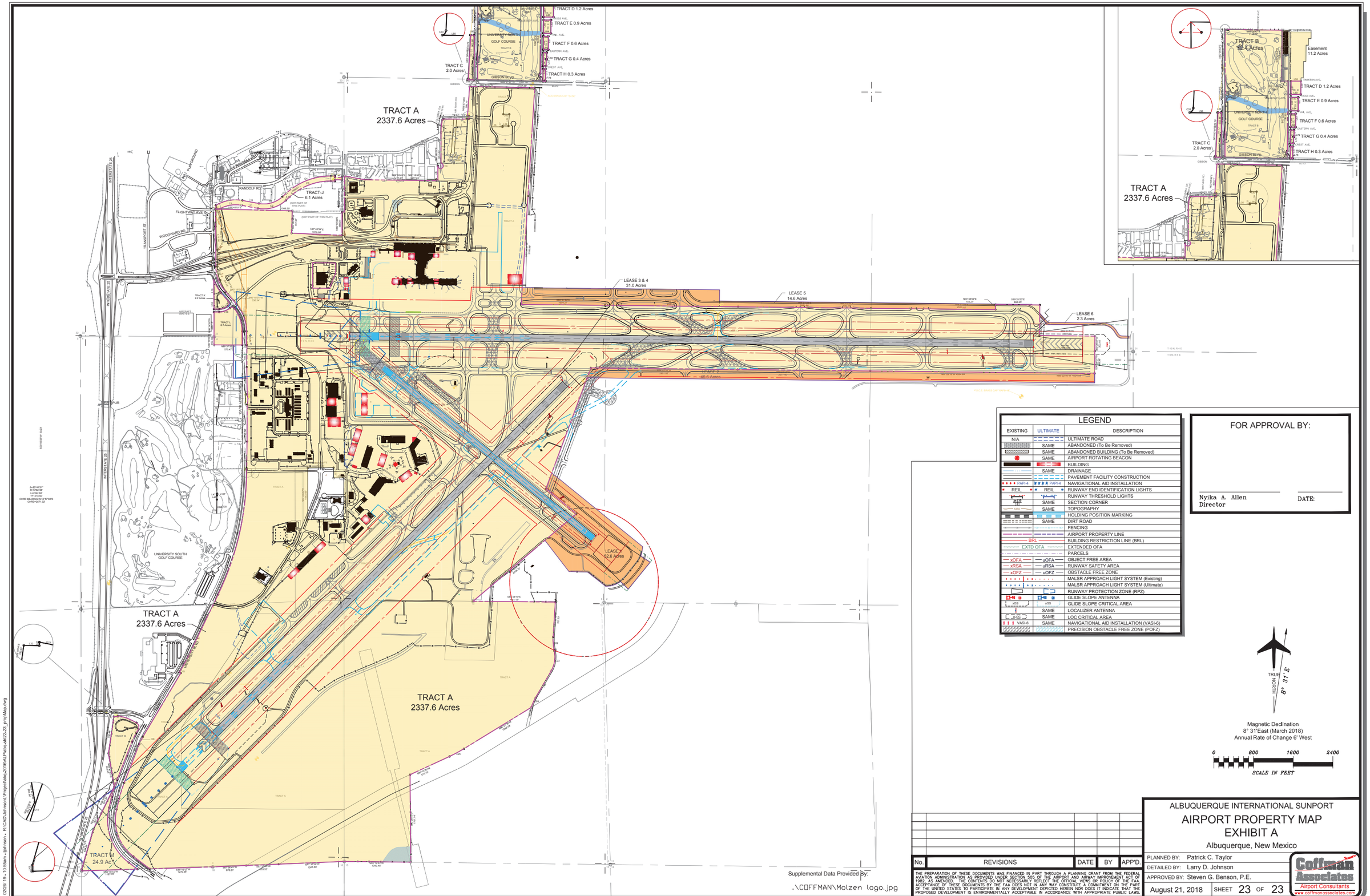
Albuquerque, New Mexico

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Steven G. Benson, P.E.

August 21, 2018 | SHEET 22 OF 23

Coffman Associates
Airport Consultants
www.coffmanassociates.com

02/20/19 - 10:55am - ljohnson - R:\CAD\Johnson\Projects\abq-2018\ALP\abq-alp22-23_proj\Map.dwg



LEGEND		
EXISTING	ULTIMATE	DESCRIPTION
N/A		ULTIMATE ROAD
	SAME	ABANDONED (To Be Removed)
	SAME	ABANDONED BUILDING (To Be Removed)
	SAME	AIRPORT ROTATING BEACON
		BUILDING
	SAME	DRAINAGE
		PAVEMENT FACILITY CONSTRUCTION
PAPI-4	PAPI-4	NAVIGATIONAL AID INSTALLATION
REIL	REIL	RUNWAY END IDENTIFICATION LIGHTS
		RUNWAY THRESHOLD LIGHTS
36135	SAME	SECTION CORNER
5350	SAME	TOPOGRAPHY
		HOLDING POSITION MARKING
	SAME	DIRT ROAD
		FENCING
		AIRPORT PROPERTY LINE
BRL		BUILDING RESTRICTION LINE (BRL)
EXTD OFA		EXTENDED OFA
		PARCELS
xOFA	uOFA	OBJECT FREE AREA
xRSA	uRSA	RUNWAY SAFETY AREA
xOFZ	uOFZ	OBSTACLE FREE ZONE
		MALSR APPROACH LIGHT SYSTEM (Existing)
		MALSR APPROACH LIGHT SYSTEM (Ultimate)
		RUNWAY PROTECTION ZONE (RPZ)
		GLIDE SLOPE ANTENNA
xGS	uGS	GLIDE SLOPE CRITICAL AREA
	SAME	LOCALIZER ANTENNA
xLOC	SAME	LOC CRITICAL AREA
VASI-6	SAME	NAVIGATIONAL AID INSTALLATION (VASI-6)
		PRECISION OBSTACLE FREE ZONE (POFZ)

FOR APPROVAL BY:

Nyika A. Allen
Director

DATE:

TRUE NORTH
8° 31' E

Magnetic Declination
8° 31'East (March 2018)
Annual Rate of Change 6' West

0 800 1600 2400
SCALE IN FEET

Supplemental Data Provided By:
..\COFFMAN\Molzen logo.jpg

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

AIRPORT PROPERTY MAP
EXHIBIT A

Albuquerque, New Mexico

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Steven G. Benson, P.E.

August 21, 2018 SHEET 23 OF 23

Coffman Associates
Airport Consultants
www.coffmanassociates.com

02/26/19 - 10:55am - jjohnson - R:\CADJohnson\Projects\ap-2016\ALP\alp-ah022-23_propMap.dwg

MONTEREY HILLS ADDITION
(FILED 2/1/40, VOL. D, FOLIO 34)

TRACT B
72.4 Acres

TRACT 1

SUNPORT LODGINGS ADDITION
(FILED 10/5/65, BK C6, PG 89)

KNOB HEIGHTS ADDN, BLOCK 21 & A PORTION OF BLOCK 17
(FILED 1/11/26, BK B2, PG 52)

TRACT B
MUNICIPAL ADDITION NO. 9
(FILED 2/5/65, BK D3, PG 106)

Easement
11.2 Acres

AVIGATION EASEMENT
(FILED 2/5/65, BK D3, PG 106)

TRACT D 1.2 Acres

TRACT E 0.9 Acres

TRACT F 0.6 Acres

TRACT G 0.4 Acres

TRACT H 0.3 Acres

TRACT C
2.0 Acres

KNOB HEIGHTS
(FILED JAN. 11, 1926, VOL. B2, FOLIO 52)

TRACT A
2337.6 Acres

AIRPORT BUSINESS PARK 4
(FILED 5/25/83, BK C21, PG 82)

AIRPORT BUSINESS PARK
(FILED 5/25/83, BK C21, PG 82)

TRACT C
MUNICIPAL ADDITION NO. 9
(FILED 2/5/65, BK D3, PG 106)
AIRPORT BUSINESS PARK
(FILED 5/25/83, BK C21, PG 82)

AIRPORT PARK
(FILED 10/7/96, BK 96C, PG 421)
TRACT A-1-C

TRACT J
MUNICIPAL ADDITION NO. 9
(FILED 2/5/65, BK D3, PG 106)

TRACT LANDS OF PARKING COMPANY OF AMERICA
(FILED 6/14/82, BK C19, PG 173)

MARSDEN AVE., 60' ROW
(FILED 6/16/82, BK C19, PG 173)

TRACT H
MUNICIPAL ADDITION NO. 9
(FILED 2/25/92, BK 92C, PG 27)

TRACT A-4
MUNICIPAL ADDITION NO. 9
(FILED 6/12/86, BK C30, PG 146)

TRACT A-1
MUNICIPAL ADDITION NO. 9
(FILED 6/12/86, BK C30, PG 146)

PARCEL 2A
SUNPORT PARK
(FILED 1/18/96, BK 96C, PG 221)

TRACT A-2 & A-3
MUNICIPAL ADDITION NO. 9
(FILED 6/12/86, BK C30, PG 146)

TRACT E-1
MUNICIPAL ADDITION NO. 9
(FILED 3/9/2001, BK 2001C, PG 72)

TRACT G-1
MUNICIPAL ADDITION NO. 9
(FILED 2/25/92, BK 92C, PG 27)

UNITED STATES GOVERNMENT
KIRTLAND AIR FORCE BASE

UNPLATTED LANDS OF THE CITY OF ALBUQUERQUE
ALBUQUERQUE INTERNATIONAL AIRPORT
(FILED: 7/17/70; DB79, PG 437-441)

LEASE PARCEL NO. 4—TAXIWAY B(UNPLATTED)

LEASE PARCEL NO. 3 & 4
TAXIWAY B (UNPLATTED) 31.0Acres

LEASE PARCEL NO. 5 = 14.6Acres
PERIMETER ROAD & FENCE(UNPLATTED)

LEASE PARCEL NO. 6 = 2.3Acres
PERIMETER ROAD & FENCE
(UNPLATTED)

LEASE 2
45.6 Acres

USC&GS BRASS CAP "KIRTLAND 3"

NGS CONTROL STA. "NMBASE 1"

NGS BRASS CAP "ABQ-65"

ACS BRASS CAP "G-7A"

U.S.C.E. BRASS CAP "KAFB-16"

FOR APPROVAL BY:

Nyika A. Allen
Director

DATE:

TRUE NORTH
GRID NORTH
8° 31' E

Magnetic Declination
8° 31'East (March 2018)
Annual Rate of Change 6' West

0 500 1000 1500
SCALE IN FEET

Supplemental Data Provided By:
..\COFFMAN\Molzen logo.jpg

No.	REVISIONS	DATE	BY	APP'D.

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

ALBUQUERQUE INTERNATIONAL SUNPORT

AIRPORT PROPERTY MAP
EXHIBIT A

Albuquerque, New Mexico

PLANNED BY:	Patrick C. Taylor
DETAILED BY:	Larry D. Johnson
APPROVED BY:	Steven G. Benson, P.E.
August 21, 2018	SHEET 23a OF 23

Coffman Associates
Airport Consultants
www.coffmanassociates.com

02/28/ 19 - 10:56am - jjohnson - R:\CAD\Johnson\Projects\abq-2016\ALP\abq-ah21_4-8_propMap.dwg

TRACT A
2337.6 Acres

TRACT M
24.9 Ac

LEASE 2
45.6 Acres

TRACT A

TRACT E-1
MUNICIPAL ADDITION NO. 9
(FILED 3/9/2001, BK 2001C, PG 72)

TRACT G-1
MUNICIPAL ADDITION NO. 9
(FILED 2/25/92, BK 92C, PG 27)

UNPLATTED LANDS OF
THE CITY OF ALBUQUERQUE
ALBUQUERQUE INTERNATIONAL AIRPORT
(FILED: 7/17/70; D879, PG 437-441)

UNITED STATES
GOVERNMENT
KIRTLAND AIR FORCE BASE

COA LANDS
UNPLATTED

UNM LANDS
UNPLATTED
PRIVATE LEASE

TRACT D-1-A-2
LANDS OF THE CITY OF ALBUQUERQUE
ALBUQUERQUE INTERNATIONAL AIRPORT
(FILED: 2/1/93; BK 93C, PG 40)

TRACT D-1-A-1
LANDS OF THE CITY OF ALBUQUERQUE
ALBUQUERQUE INTERNATIONAL AIRPORT
(FILED: 2/15/93; BK 93C, PG 40)

TRACT D-2
LANDS OF THE CITY OF
ALBUQUERQUE
ALBUQUERQUE INTERNATIONAL
AIRPORT
(FILED: 8/7/91; BK 91C, PG 163)

TRACT 1
UNIVERSITY OF
NEW MEXICO
BUSINESS PARK
(FILED 2/15/93;
BK 93C,PG 40)

TRACT 2
UNIVERSITY OF NEW MEXICO
BUSINESS PARK
(FILED:11/9/92; BK 93C, PG 248)

LANDS OF THE CITY OF ALBUQUERQUE
ALBUQUERQUE INTERNATIONAL AIRPORT
(FILED: 9/20/91; BK 91C, PG 167)

ALBUQUERQUE
INTERNATIONAL SUNPORT
RUNWAY 12-30 EXTENSION
LEASE
(UNPLATTED)

ALBUQUERQUE
INTERNATIONAL SUNPORT
RUNWAY 12-30
EXTENSION LEASE
(UNPLATTED)

ALBUQUERQUE
INTERNATIONAL SUNPORT
RPZ LEASE PARCEL
(UNPLATTED)

PARCEL E (UNPLATTED)
LANDS OF THE CITY OF ALBUQUERQUE
ALBUQUERQUE INTERNATIONAL AIRPORT
(FILED: 11/22/85; D256A, PG 67)

PARCEL A, TRACTS 30-
LANDS OF THE CITY
ALBUQUERQUE INTERNATIONAL AIRPORT
(FILED: 4/27/84; D210A, PG 349)

PARCEL B, TRACT 33 (UNPLATTED)
LANDS OF THE CITY OF
ALBUQUERQUE
ALBUQUERQUE INTERNATIONAL
AIRPORT
(FILED: 4/27/84; D210A, PG 350-351)

PARCEL B, TRACT 34 (UNPLATTED)
LANDS OF THE CITY OF ALBUQUERQUE
ALBUQUERQUE INTERNATIONAL AIRPORT
(FILED: 4/27/84; D210A, PG 350-351)

PARCEL B,
TRACT 35 (UNPLATTED)
LANDS OF THE
CITY OF ALBUQUERQUE
ALBUQUERQUE
INTERNATIONAL AIRPORT
(FILED: 4/27/84; D210A, PG 350-351)

PARCEL B, TRACT 35 (UNPLATTED)
LANDS OF THE CITY OF ALBUQUERQUE
ALBUQUERQUE INTERNATIONAL AIRPORT
(FILED: 4/27/84; D210A, PG 350-351)

PARCEL C (UNPLATTED)
LANDS OF THE CITY OF
ALBUQUERQUE
ALBUQUERQUE INTERNATIONAL
AIRPORT
(FILED: 4/27/84; D210A, PG 349)

PARCEL C (UNPLATTED)
LANDS OF THE CITY OF
ALBUQUERQUE
ALBUQUERQUE INTERNATIONAL
AIRPORT
(FILED: 4/27/84; D210A, PG 349)

UNIVERSITY BOULEVARD
EXTENSION
LANDS OF THE CITY OF
ALBUQUERQUE
ALBUQUERQUE INTERNATIONAL
AIRPORT
(FILED: 6/25/98; BK 9811, PG 7436)

TRACT A
LANDS OF THE CITY OF ALBUQUERQUE
ALBUQUERQUE INTERNATIONAL AIRPORT
(FILED: 10/9/80; BK C17, PG 99-102)

DRAINAGE EASEMENT

TRACT B ATSF RAILWAY
PERPETUAL EASEMENT
(UNPLATTED)

IRA SPRECKER
DRIVE EASEMENT

MUNICIPAL ADDITION NO. 4
(FILED: 12/11/58; BK C-4, PG 58)

NGS CONTROL STA. "MANASE 1"

NGS BRASS CAP "ANG 6"

NGS BRASS CAP "ANG 7"

N89°22'16"W 2961.92'

N89°22'16"W 2677.40'

S89°28'19"E 1661.17'

S89°24'27"W 2650.00'

S89°24'27"W 2651.00'

S89°41'53"E 704.89'

S64°41'53"W 2755.14'

S89°24'27"W 1552.15'

S65°12'53"W 877.75'

S87°19'43"W 707.53'

S89°19'43"W 1342.48'

S87°36'28"W 1325.69'

S87°35'55"W 653.55'

S87°16'24"W 676.51'

S88°16'13"W 1270.66'

S88°16'13"W 1127.98'

N25°16'49"E 1358.44'

N89°24'27"E 522.32'

S89°16'40"W 730.50'

S00°01'33"E 833.72'

N00°00'00"W 1045.95'

N00°00'00"E 445.17'

N00°44'48"W 2636.59'

N00°08'08"E 1.46.67'

N00°07'33"E 640.13'

S00°04'08"W 33.23'

Δ=25°41'21"
R=5782.58'
L=2592.68'
T=1318.50'
CHRD BEARING=N12°57'08"E
CHRD=2571.02'

N89°18'54"E 2636.54'

N89°18'54"E 2636.54'

N00°41'06"W 669.46'

N89°18'54"E 2636.54'

N89°18'54"E 2636.54'

N89°18'54"E 2636.54'

N89°18'54"E 2636.54'

N89°18'54"E 2636.54'

N00°41'06"W 669.46'

N00°41'06"W 669.46'

N00°41'06"W 669.46

www.coffmanassociates.com

KANSAS CITY
(816) 524-3500

237 N.W. Blue Parkway
Suite 100
Lee's Summit, MO 64063

PHOENIX
(602) 993-6999

4835 E. Cactus Road
Suite 235
Scottsdale, AZ 85254